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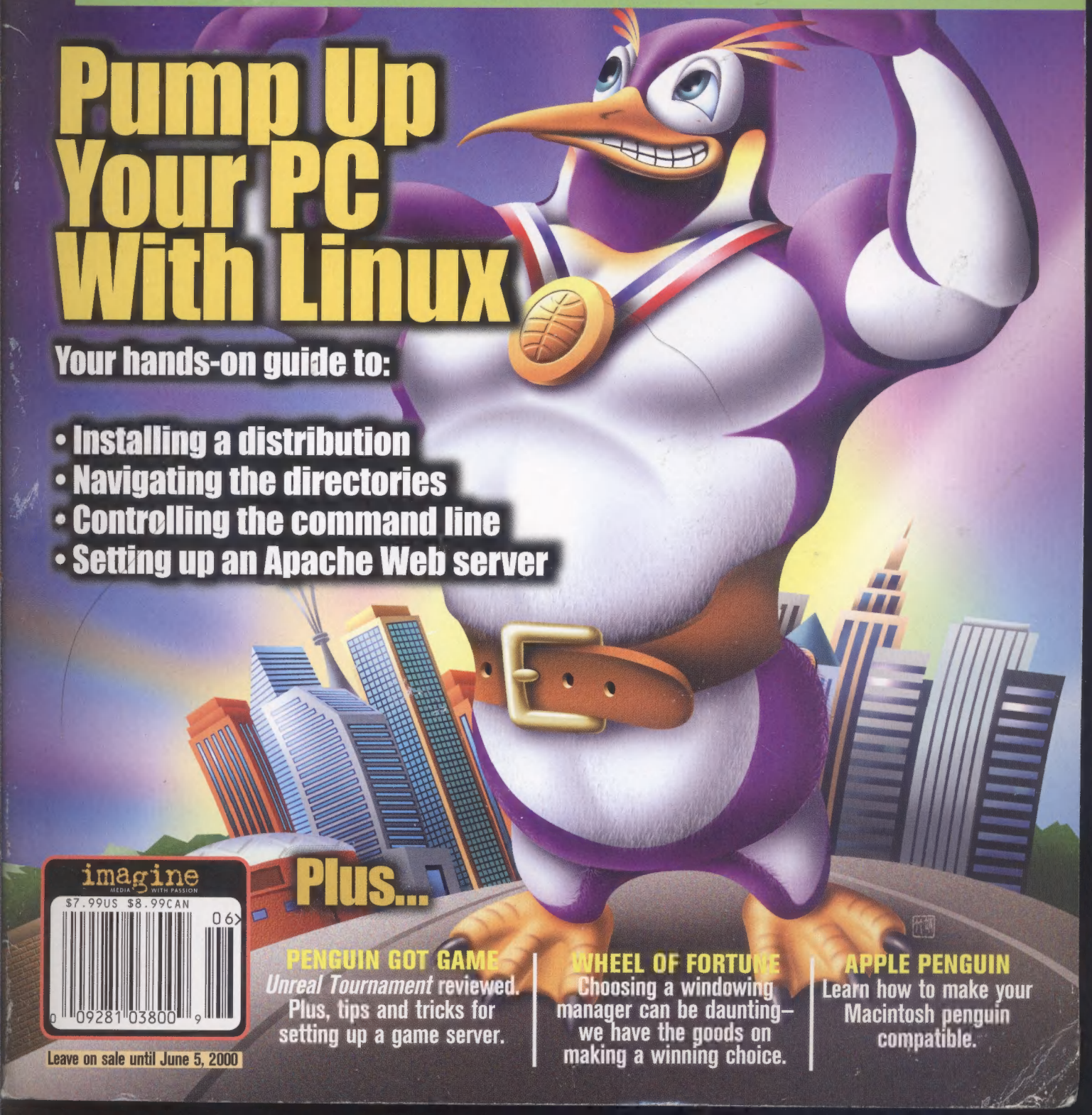
MAY/JUNE 2000



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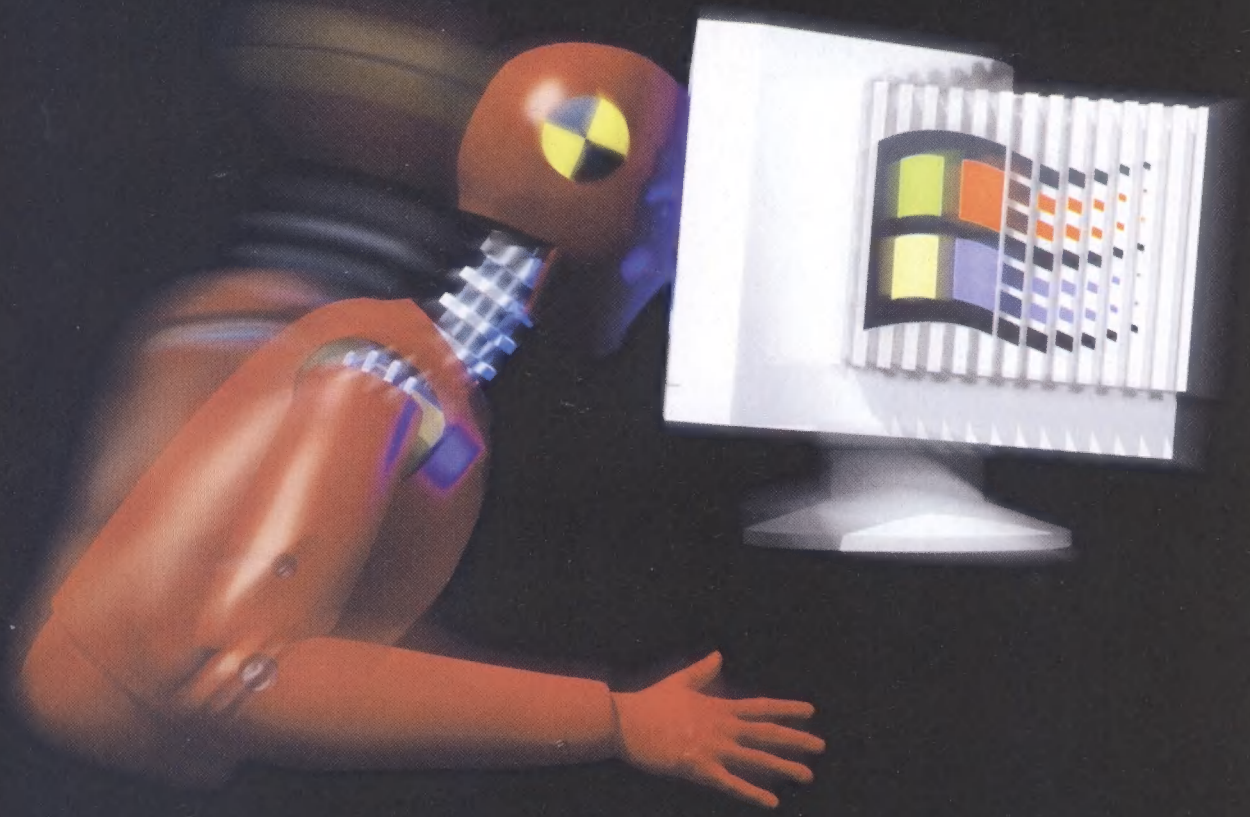

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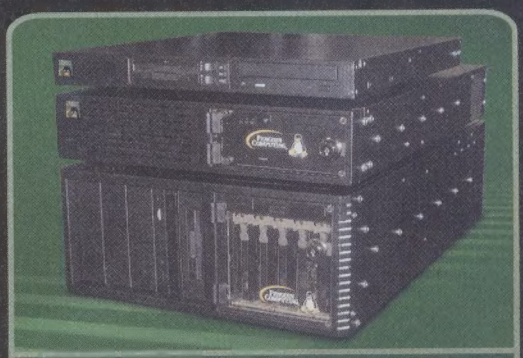

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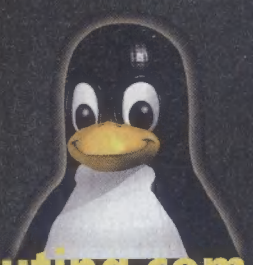

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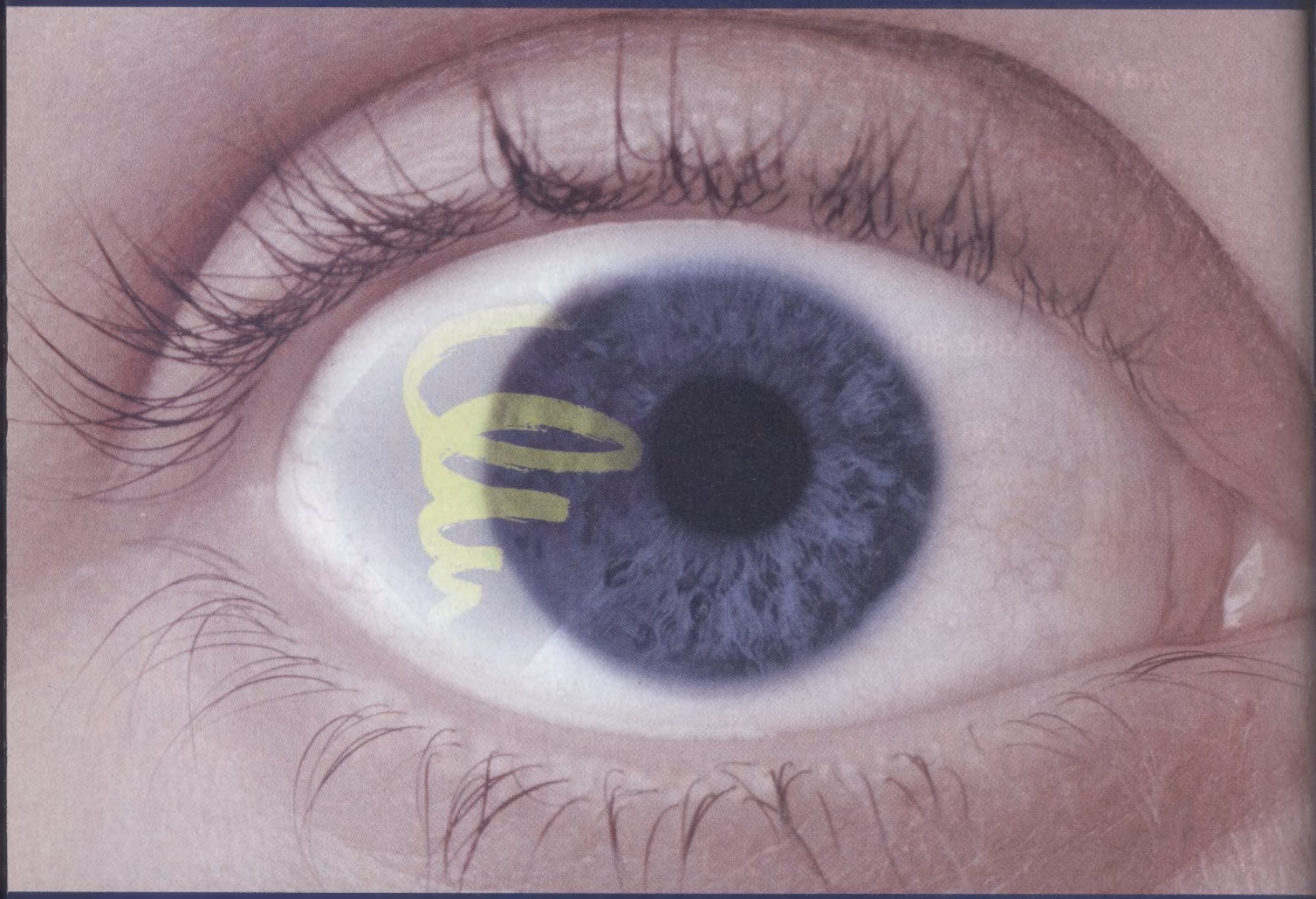
storm watcher



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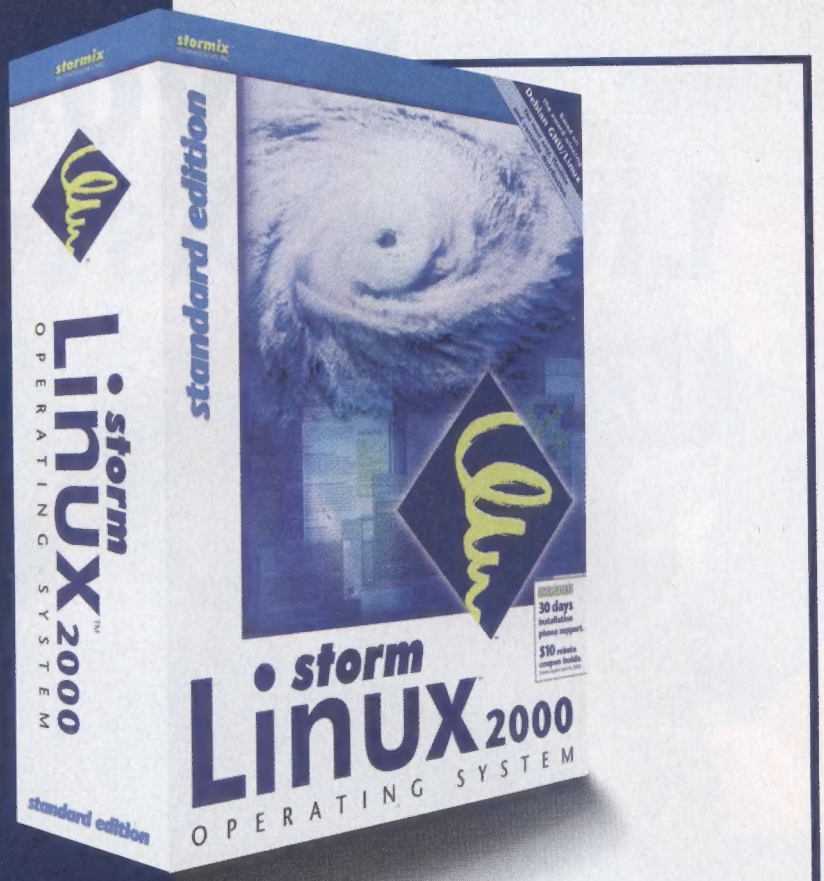

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Graphical Install	✓	✓	✓	✓
Graphical Boot Manager	✓	X	✓	X
Choice of Desktops	✓	✓	X	X
PartitionMagic™ Partitioning Tool	✓	X	X	✓
VMware™ Virtual Machine demo	✓	X	X	X

Source: Respective competitors' web sites as of Nov 27/99

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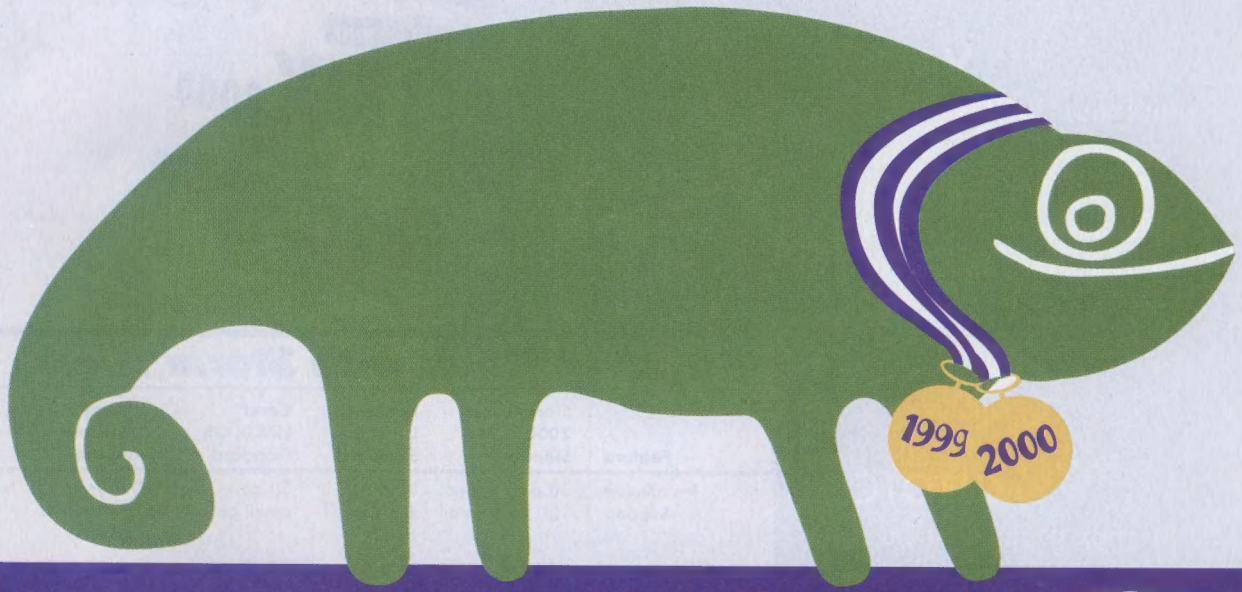

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New to Linux? Can't figure out the pesky command line interface? *Maximum Linux* is here to help you through the process.

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Setting up your own Web server doesn't have to be a white-knuckled ride. Join our very own Mr. Nice Guy, Anders Brownworth, as he takes you on a tour of Apache, the world's most popular–and Open Source–Web server.

53 Penguin PDA

Scott Locklin, a rocket scientist dude we met while bar-hopping in Berkeley, was on a mission: to find a PDA that works with Linux. In the first part of our special two-part series, Scott scopes out the software, analyzes the OSes, and dissects the hardware.

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You don't have to get lost while navigating in Linux land. Let *Maximum Linux* be your navigator through Linux's confusing directory structures.

64 The Power User's Guide to KDE and GNOME

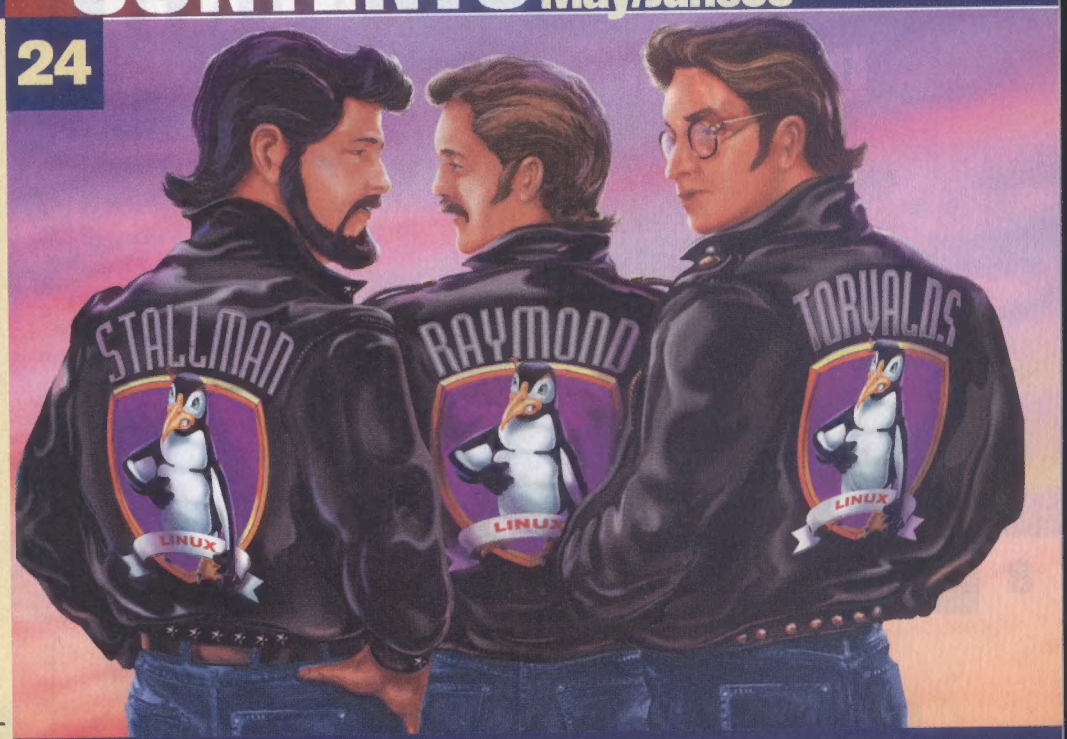
Choosing the right graphical interface for Linux can be about as difficult as finding the correct answer to Regis Philbin's million-dollar question. We give you the tips and tricks to master KDE and GNOME and provide a few cool alternatives.

71 Penguin Got Game

Forget what you heard: Linux is for gaming, too. This month, Mike Luton steps away from his network duties to explore the wonderful world of *Unreal Tournament.* Plus, he's been nice enough to provide all the ammo you'll need to set up a fraggin' good game server

78 Giving Your Mac the Bird

Linux isn't just for IBM-compatible PCs, you know. We crept into the editorial offices of *Mac Addict* recently, kidnapped Executive Editor David Reynolds, and forced him at Penguin-point to write this compelling feature about setting up your Macintosh computer with Linux. Read this or David dies. We 'aint kidding.



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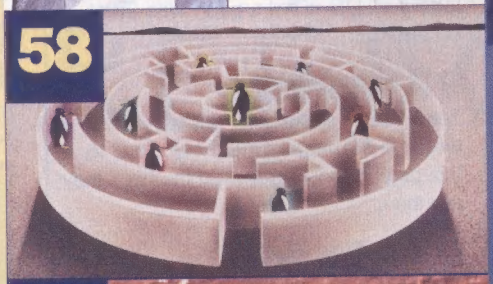

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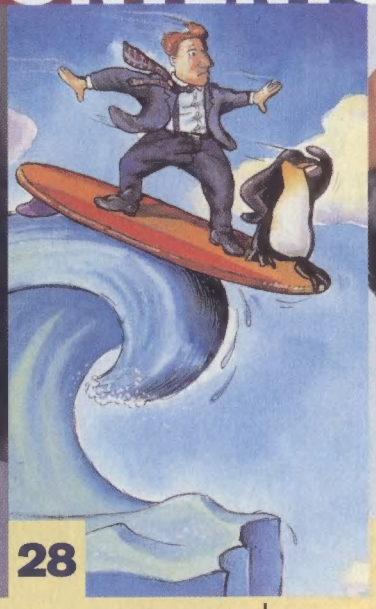

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92 Terminator
You know all those blue, underlined words in *Maximum Linux*? Hyperlink to this page to figure out what the heck they all mean.

93 Writer Bios
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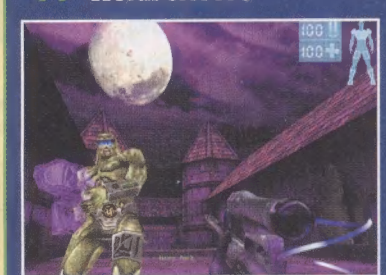
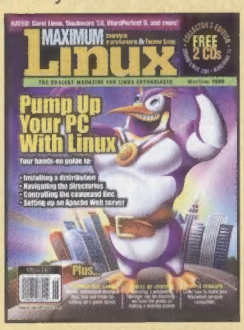


72 Unreal Tournament

About the cover:
This month's cover was illustrated by Jeffrey Oh. Born in Korea and educated at the Maryland Institute of Art College, Jeffrey hankers to be a PGA tour player in his next life. As a freelance illustrator, Jeffrey has created compelling characters for such illustrious corporations as the Baltimore Orioles and Walt Disney.



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EdWord

Get Ready For An Exciting Ride

Welcome to *Maximum Linux* magazine! Or, should I say, welcome back! We produced the first issue of *Maximum Linux* late last century. At the time, we weren't really sure how you'd respond to our irreverent tone, and the exciting variety of articles we presented. Penguins lay awfully large eggs, you know, and they have to waddle around with them on their toes for weeks. Perhaps that would be our doom. Remember, the Twentieth Century was full of Fear, Uncertainty, and Doubt.

However, I knew we were onto something big—bigger than all of us had ever imagined—a few days after the magazine hit the newsstands. The next Monday morning, my e-mail Inbox was stuffed with more than 300 messages from rabid readers foaming at the mouth for more! In a few weeks, the e-mails approached 1,000, and eventually exceeded 3,000. Letters came in from all over the Globe, including England, Australia, Slovenia, Germany, Hungary, and Bosnia.

Our circulation department was amazed by reports that the more than 100,000 copies we printed and distributed all across the world were snatched up by Linux fans in a matter of minutes. Today, they are collector's items. Many wrote to us, complaining bitterly that they couldn't find the first issue, and then wrote back a month or two later asking, "where the heck is issue number two?"

Meanwhile, I was reading all your messages, replying to those that I could, and making extensive notes, just in case we were green-lighted. It didn't take long. The message was loud and clear. Never argue with a hungry Penguin. We had to feed your need. And fast!

Which brings us to this issue of *Maximum Linux*. From here on out, we're going to be on a regular schedule, producing a new issue every other month. In addition to continuing to produce the coolest Linux magazine on the planet, I'd like to take this time to offer myself—and the rest of the *Maximum Linux* staff—as your personal Linux attendants. Got a problem you can't solve? We don't do house calls, and we don't repair broken Windows, but hey, we'll be happy to help you out in your time of need. In fact, that's really our mission. We're committed to providing content that everyone will find compelling, resourceful, and informative.

But, as I've said previously, we can't do this alone. We need your help too. So, we'd all appreciate it if you could find the time to jot down a note or two to tell us how we're doing. We are grateful for your support thus far of *Maximum Linux*, and we'll use your comments, good or bad, to produce the magazine you've always wanted—and deserved.

Sure, *Maximum Linux* is new. But this is a new century, and we're going to embark on this great adventure together.

Thanks for reading. It's going to be an exciting ride!

Bryan Del Rizzo

Bryan Del Rizzo
Editor-In-Chief
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MAXIMUM Linux news reviews & how tos
May/June00 vol1 issue1

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DISC PAGES

Installing Storm Linux 2000

This month's issue of *Maximum Linux* includes *Storm Linux 2000*, a new Debian-based distribution. Produced by Stormix Technologies of Vancouver, Canada, *Storm Linux* offers many nice features, including both a graphical and a text-based install, KDE and GNOME desktop environments, updated Xfree86 (version 3.3.5), Kernel 2.2.13, and more.

By Carl Constantine

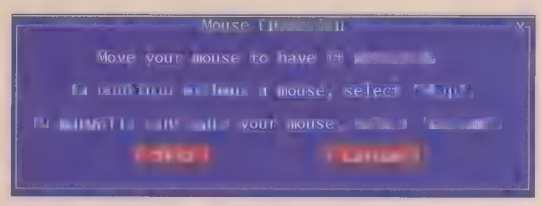
PRELIMINARY SETUP

Installing *Storm Linux* is a fairly easy–and painless–process. If your computer supports booting from CD, put the Stormix CD in your CD-ROM drive and restart your computer. *(Note: Some systems may require you to change a BIOS setting for this to work.)* **If your computer does not support CD booting, run the mkbtdk.bat program on the Storm CD to create a boot floppy.**

Note: *Storm Linux doesn't currently support installations from hard drives, FTP downloads, or over a Network File System (NFS). According to the company, these options will be ready for the next version.*

When the initial screen appears with the boot prompt, hit Enter or wait until it starts by itself. If you agree to the Stormix End-User License Agreement, choose Accept (the default setting) by hitting Enter again. If you don't agree, use the Tab key to move the selection and then hit Enter.

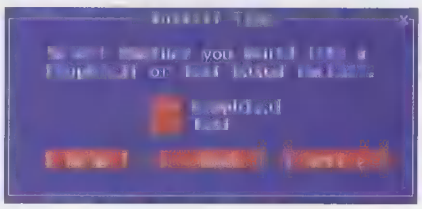
Assuming you agree to the license, the installer checks for any SCSI devices and a CD-ROM drive.



The installer then asks you to move your mouse to be detected. Follow the instructions on the screen for further details.

1 CHOOSE YOUR WEAPON

You can choose between a graphical or text-based install. We chose a graphical install, but the procedures for the text installation are exactly same.



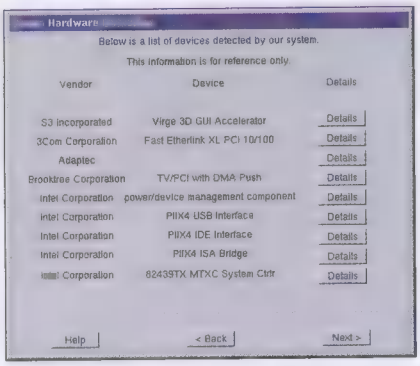
(Note: Many install screens include a "help" button. If you are confused about the options available on a particular screen, click **Help** to find out more.)

BONUS CD!

Be sure to try out the Macmillan Linux Mandrake 7.0 disc also included with this issue of *Maximum Linux*.

2 HARDWARE DETECTION

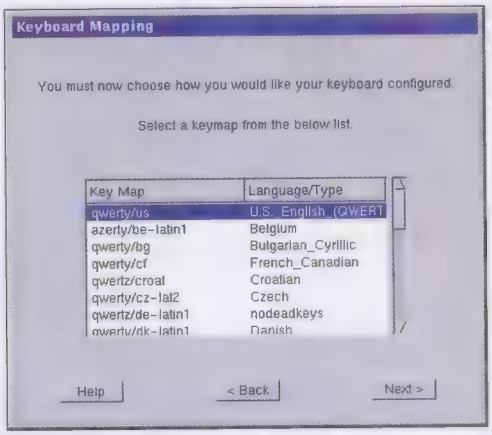
The Storm Installer continues to check the hardware on your computer, displaying info about your video card, sound card, and more. Click **Details** to see more information on a particular piece of hardware. Click **Next** when finished.



Note: *Some newer hardware peripherals, such as 3dfx's Voodoo3 graphics cards and Creative Labs' SoundBlaster Live sound cards won't be properly detected, resulting in a "Device not in database" message. This doesn't mean the hardware won't work, but, in such cases, you'll need to configure the device manually after the install is finished. If you're unsure, check with Stormix Technologies for further details.*

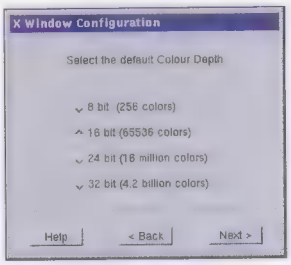
3 CONFIGURE THE KEYBOARD

This couldn't be any easier. Select your keyboard of choice. The default is the standard QUERTY/US configuration.

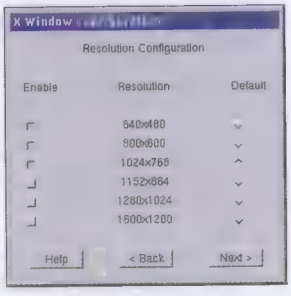


4 CHOOSE SETTINGS FOR X

You'll have to decide now if you want to install the X Windowing System. X provides the interface layer for the graphical desktop clients such as Gnome and KDE. The default is **yes.**

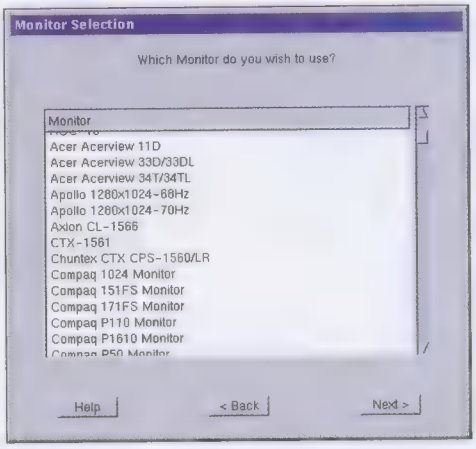


Note: *If the computer on which you're doing the install is going to be a server only, you may not need to install X. But, since some administration tools do use X, you might want to consider it.*



Choose the default color depth you wish to use. The default is 16-bit. Check the manual that came with your video card and monitor to determine the maximum supported color depth.

Choose the default resolution for X, as well as any alternative configurations you might want to run.

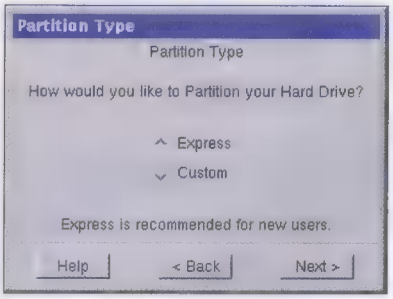


Note: *It's a good idea to support as many resolutions as your monitor and video card can handle.*

Choose your monitor from the Monitor List. If your monitor isn't on the list, choose one of the generic settings (Super VGA 800x600@56Hz, for example). You may need to reconfigure using XFree86Setup and input your monitor's vertical and horizontal refresh rates manually (see page 12).

5 PARTITION YOUR HARD DRIVE

Hard drive partitioning plays a critical role in Linux. First-time Linux users should choose the Express option.

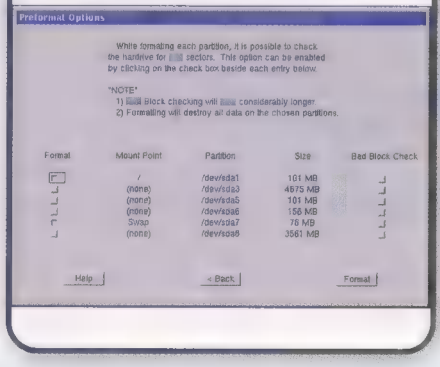


This will create two partitions: the Swap partition (which you should set to the same size as your PC's actual RAM or 128MB, whichever is less) and the root (/) partition, filling out the rest of your drive. If you're a more advanced Linux user, choose the Custom option and partition your drive however you want. Click **Next** when done.

Tip: *If you have two drives in your machine, put the Swap partition on the second drive to reduce possible disk access and "thrashing" of your primary drive.*

The "Preformat Options" screen allows you to choose which partitions you want formatted, as well as Bad Block Checking (Figure 12). Click **Format** when done.

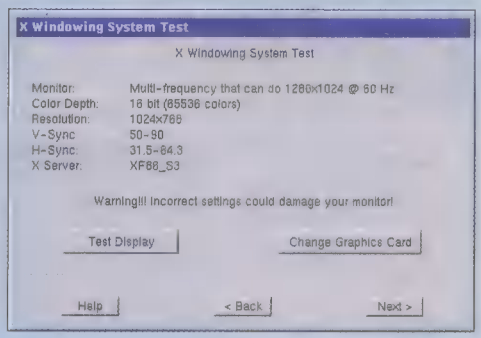
Tip: *If you're installing to a brand new hard drive, you can probably skip the Bad Block Check. However, it's still a good idea to check for bad blocks. Be warned: Bad Block Checking may take a while to complete!*



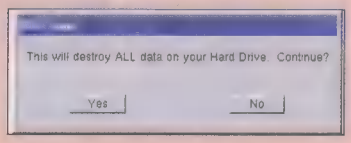
GO FREE WITH XFREE86

XFree86Setup is the program used to configure the X Windowing System whenever you want to change the setup, such as adding a different video card or monitor. In both cases, you need to run XFree86Setup to change the settings.

The X Windowing System Test screen allows you to review the settings you've chosen for the video card and monitor. This dialog also shows the video driver, called the X Server, that will be used. If you need to change the settings for the X Server, click Change Graphics Card. Otherwise, click Test Display to ensure that the settings you've chosen work. If you do not see the test image, or if the image doesn't quite fill the screen, you can go back and try different settings. Assuming everything worked, and we hope it did, click Next.

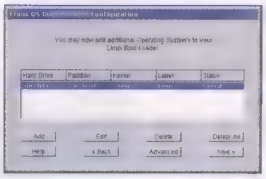


WARNING! If you're installing Linux on a computer that you intend to dual boot with Windows, don't use the Express option, as it will completely reformat your hard drive. Use the custom option, or a utility such as PowerQuest's *Partition Magic*. A limited version of *Partition Magic* is bundled with the retail version of *Storm Linux 2000*. If you have cash to burn, you can buy a second hard drive for your computer and install Linux on the second drive. This is the safest and most flexible solution.



6 LILO CONFIGURATION

Now you must choose where to install LILO. Most of you should just accept the default settings. Make sure you write the changes to disk to save your configuration.



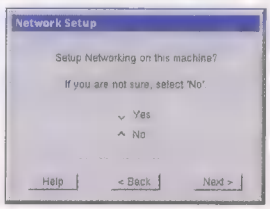
Tip: *Use the LILO Configuration screen to set up LILO to boot other OSes already installed on your PC.*

LILO stands for Linix LOader and is a small software program installed on the Master Boot Record (MBR) of your hard drive. LILO controls the initial startup processes of your computer and can be configured to boot multiple OSes including Windows and DOS.

7 NETWORK CONFIGURATION

If your computer has an Ethernet network card, you can choose to set it up now or later.

Tip: *If you're connected to a network via a cable modem or other high-speed connection, choose **No** at this screen and set up networking after everything is installed.*



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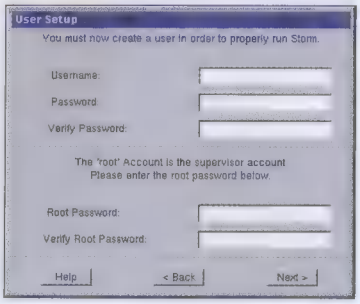
8 ROOT & USER ACCOUNT SETUP

Storm Linux forces you to create a user account other than root during the install process. Choose a new user account name for your personal use. Do not use the root account for your day-to-day needs. Choose passwords for this account and the root account.

Tip: *You should choose passwords that are hard to break, but ones that you will remember. Alternate between alphabetic and numeric characters in your passwords.*

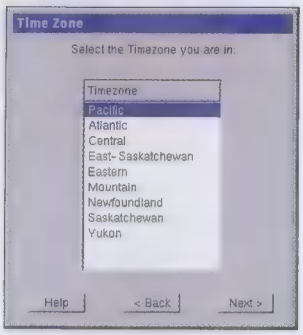


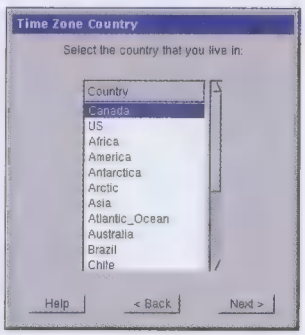
The root account is often referred to as the "super user" account. Root allows you to do anything and everything on your computer, including deleting files that should not be deleted. To be safe, always use a personal account for daily use, and use root for special needs, such as creating user accounts, installing new software, and so on.

9 TIME AND DATE CONFIGURATION

Choose your Time Zone, Continent, and physical time zone for your city.

Note: *Storm Linux prefers to have your hardware (CMOS) clock set to Greenwich Mean Time (also called UTC). Stormix then calculates your local time using your time zone setting.*

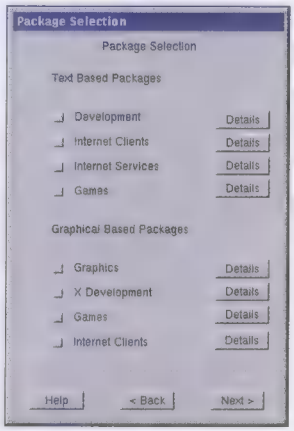




10 PACKAGE SELECTION

Storm Linux provides many popular extra packages for you to install. Click on the **Details** button to find out what is installed in each category. Choose your options and click **Next**.

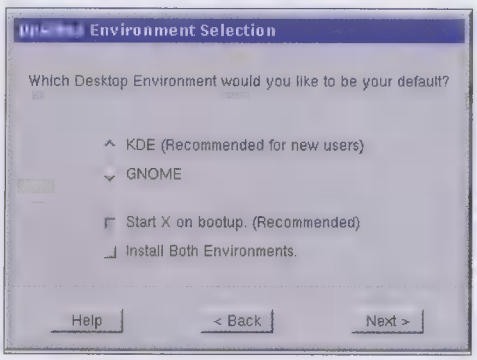
Tip: *Install all the development tools and libraries. Some of the Linux software that's on the Internet is only available as source code. In those cases, you'll need to build the software using the development utilities and libraries.*

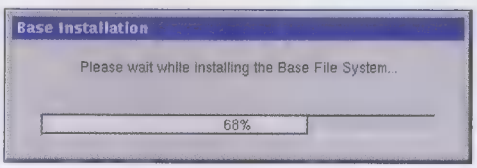


11 DESKTOP ENVIRONMENT

Choose which desktop manager (KDE or GNOME) you wish to use by default. You can install both of these environments or just one. Also, choose whether you wish to start up in X mode at boot time. New Linux users should choose this option.

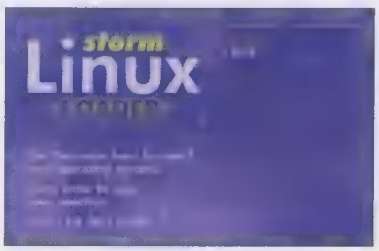
At this point, Storm starts installing all the base packages and then proceeds to install all your package choices. Depending on your PC's processing prowess, the install should proceed relatively quickly.





12 RESTART

Remove the install CD and restart your computer. You should see the LILO screen shown below. Hit **Enter** to start Linux and finish configuring the packages. You now have a nice *Storm Linux 2000* system!



Tip: *If you changed your BIOS settings to boot from the CD-ROM, you may need to change it back to boot from the hard drive at this point.*

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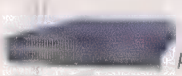

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rants&raves with Colonel X

Do you get tired of hearing people whine and complain on chat channels about who has the greatest flavor of Linux? I do...and it's lame. Or maybe you're fed up with the Windows vs. Linux, Gates vs. Torvalds Royal Rumbles. I know I am. I love the Linux operating system, but damn, enough is enough. I'm a big Linux supporter, but sometimes the Linux world rubs me the wrong way. Got something that bugs the crap out of you? E-mail me at rants@maximumlinux.com and let the penguin feathers fly.

Big Red or Slackware: Just Do It Already!

Every time I get on some sort of chatting spree with someone, and I start talking about Linux and Windows, I always have to listen to a bunch of whiny bastards all getting upset over who has the greatest distribution. You know what I think? Who gives a rat's ass? I don't...and neither should you. For starters, it doesn't matter what friggin' distribution you're using! What matters is what distribution you used from the very beginning. If you tried other distributions, and then finally settled on one specific flavor, then that's the best one for you. Period. I get so sick and tired of hearing these worthless debates over Linux distributions that it's pretty much comparable to who has the biggest...well, you get my point. The only real differences between flavors of Linux are packages that are included in the distribution, package management– i.e., rpm, pkgtool, etc.–and, last but not least, install methods. That's it...now get over it.

The Infamous "20 Million Lines of Code" Complaint

Well since I'm all hyped now, I think I'll get into something else that's been bugging me. It's so hyped up by the freakin' media that I'm about to pull my hair out. To make matters worse, now I'm getting e-mails from some guy named Vern concerning how many lines of code Windows 2000 has and how all those lines of code are nothing but a poor attempt at sloshing Windows 95 and Windows NT kernels together in order to make some "wonder OS." Yeah, so? What really gets me is that people like to complain incessantly about "20 million lines of code," but they keep forgetting that this is an operating system that may change the way we compute for the better. Not only will Windows be a lot more stable because of the addition of the NT kernel, but it will also feature some really cool additions, such as encryption on the fly and other neat toys. What's really going to be cool is the rumored support for the Linux ext2 filesystem. Yep, that's right. There may even be write support for Linux as well. Course, that's still only a rumor, so don't come looking to whup my ass if it 'aint true. Regardless, you know what I say? Bring on those millions of lines of code. If Windows 2000 actually does everything that Microsoft promises it will, then I'm all for it. Don't bash Windows just because of its shady past. Sure, Linux is the best alternative available, but who says we can't have the best of both worlds?

Mr. Gates, CEO?

The other day when I got home from work, I sat down to read some security-related white papers, when suddenly I got a call from a guy who called himself "Moroni." He kinda sounded like that ugly killer dude on *Scream* (the original–not those lame ass sequels), and I started to feel my palms get all sweaty. After about 10 minutes of hearing him make crap up about how he was going to kill me and stuff, I finally asked him what he wanted. He just started laughing and I knew it was a friend of mine. He proceeded to tell me how our favorite neighborhood arch-enemy Bill Gates had decided to step down from being the big dog to Chief Software Architect. He asked me if I had heard about it. Who hadn't?!

> "I get so sick and tired of hearing these worthless debates over Linux distributions that it's pretty much comparable to who has the biggest... well, you get my point"

I never really cared for Bill's little creation called Windows. The reason that Billy Boy stepped down is that he wants to learn a little more about Linux. That's what I think. Oh c'mon, quit laughing–you know it's true. Bill has finally realized that Linux is a major threat, and now that he's become this so-called Chief Software Architect guy, he has to get his act together and get all those engineer guys he hired to finally realize that Linus was right all along.

I've even heard in a few Linux circles that now that Gates has stepped down, Linux can "go for the throat," so to speak. Windows 2000 may surprise a lot of people. Then again, it might not. But one thing is for sure, you can bet your bottom dollar that Linux will continue to step up to the challenge and prove to all of those doubters out there that it can, indeed, hang with the big boys!

Colonel X is a former Navy Seal and currently works as a private security consultant. In addition to Linux, Colonel X specializes in EOD, psyops, and prisoner interrogations.

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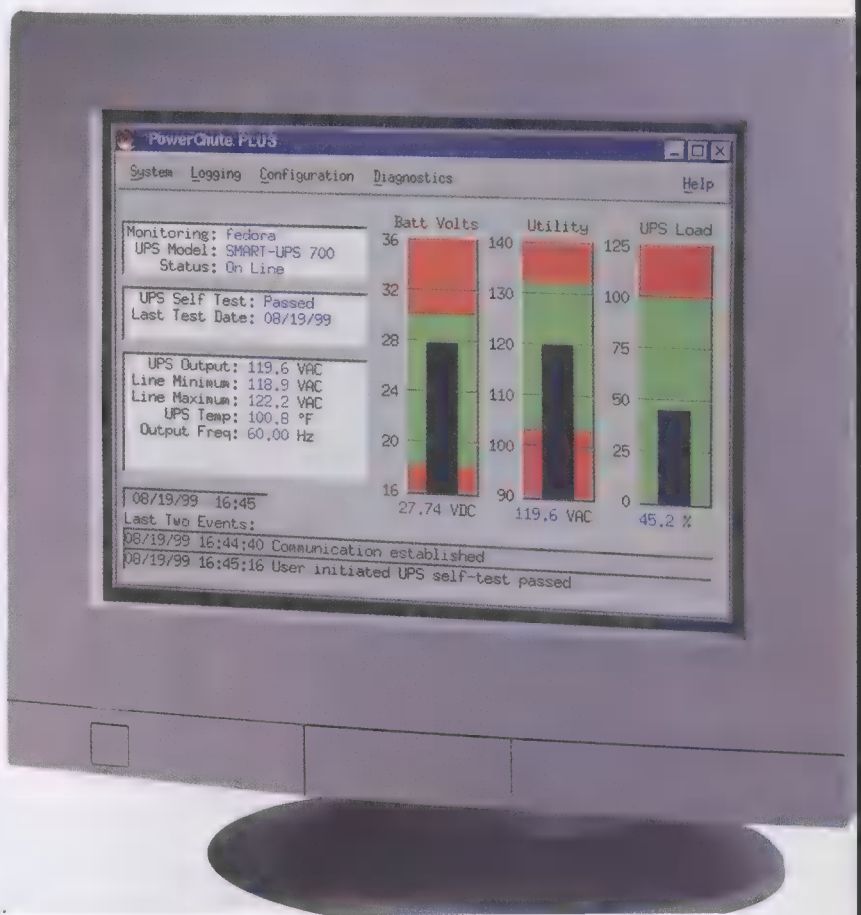

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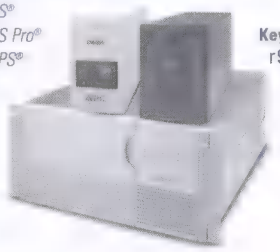

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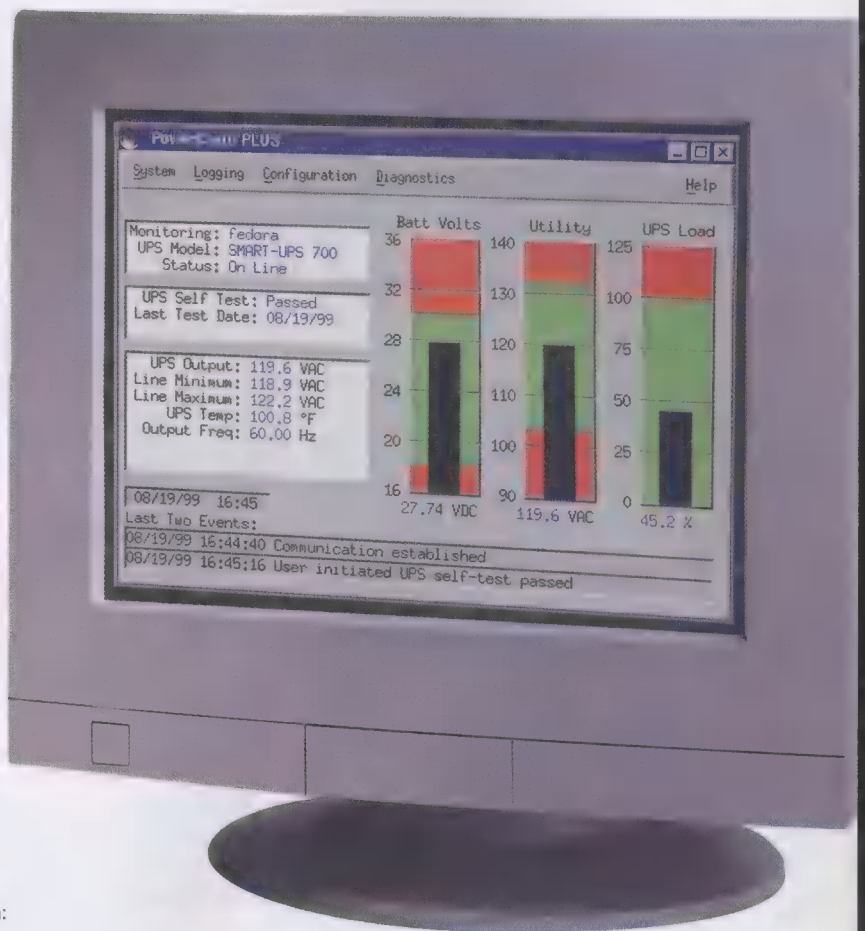

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Paul McNamara, General Manager, Enterprise Market Segment at Red Hat Software, Inc.

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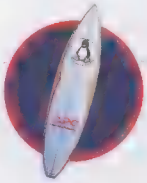

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Talk Back

Hoo boy! We received more than 3,000 letters, faxes, and e-mails regarding the test issue of *Maximum Linux* that hit stores last year. Most were kind, others downright hostile. Regardless, we love hearing from you, the readers, about what we're doing right or wrong, and the sorts of things you'd like to see in your favorite new Linux magazine. So, if you've got something you want to get off your chest, sit down in front of your Linux box and start typing away. Our mailbag address is editor@maximumlinux.com. Be sure to include your full name (that means first and last name) and your home town. Due to the overwhelming amount of mail we receive, we can't personally respond to every letter. But, we promise to read everything you send our way. Honest. No kidding. Really. We mean it!

Linux Propaganda

Will the portrait of Linus that you had in the test issue of *Maximum Linux* be made available in poster form or something? It's quite beautiful.

Edgarde

Although I think the concept of a Linux magazine is well timed and appears well thought out, I can only hope that no thought was put into the "poster" of Linus Torvalds that appears on page 13 of the test issue. This poster eerily resembles those promoting Nazi Germany and Hitler Youth just prior to World War II. I asked others to comment to see whether this impression was unique to me, but they were all struck by the same thoughts. I am sure that this was not the intent (or I certainly hope it wasn't), but it is likely that I am not the only one who was taken aback by the unfortunate similarity.

It matters little to me if you publish this in your magazine, but I would like this addressed by the Editor or, perhaps more appropriately, the Publisher.

Carl A. Laskin, MD

Editor-in-Chief Bryan Del Rizzo replies: We've had many requests for this artwork. The portrait was illustrated by Jae Shim, and first appeared in the August 1998 edition of *boot Magazine*, my former alma mater. You can view it online at www.maximumlinux.com. This style is often called Constructivist and is usually associated with the Russian Communist Revolution, although some Nazi artists borrowed it. It was widely used around the world in the 1930's by many governments, not least of which was the United States. Many public buildings and monuments across America are decorated in this style, and American artists have been denounced in Congress as Communists, not Nazis, for such work. Jae Shim's illustration is a witty play on "world domination," and it aptly reminds us of the energy, innovation and mobilization often manifested at the beginning of great movements. Next time you're in the computer section of a bookstore, check out the Constructivist art Cisco publishes on the front covers of its textbooks.

> "This is the first time in many years that I have gone through an entire magazine issue, cover to cover, let alone 3 times. Please keep it coming. I sent in the subscription card within an hour of opening the magazine!"

FTD Bouquet

First off...I love the magazine! I'm fairly new to the world of Linux, but, I feel the magazine will be a great tool and source of information for newbies and gurus alike. However, you had a typo in the test issue. You defined "FTP" as "File Transfer Point." Shouldn't that be "File Transfer Protocol?"

Adam Moore

Copy Editor Martha Sigwart replies: Yes. Rest assured, now that I'm on board, these sorts of careless mistakes will never happen again. [sound of cracking whip]

Mac Tricks Times Two

I have read *Maximum Linux* front to back. Three times! Before I read it, I was a little skeptical on switching from Windows 9x. Now that I have read this magazine, I have overcome my fears, and have decided to take the plunge into the world of Linux. A million thanks to you! Keep up the great work. I will be a definite subscriber!

AJ Bubb

Hey there! I've gone through the entire first issue three times already, cover to cover. I can't wait for the next issue! When will it be here? This is the first time in many years that I have gone through an entire magazine issue, cover to cover, let alone 3 times. Please keep it coming–I sent in the sub card within an hour of opening the magazine!

Gene & Barbara

An Unsatisfied Reader

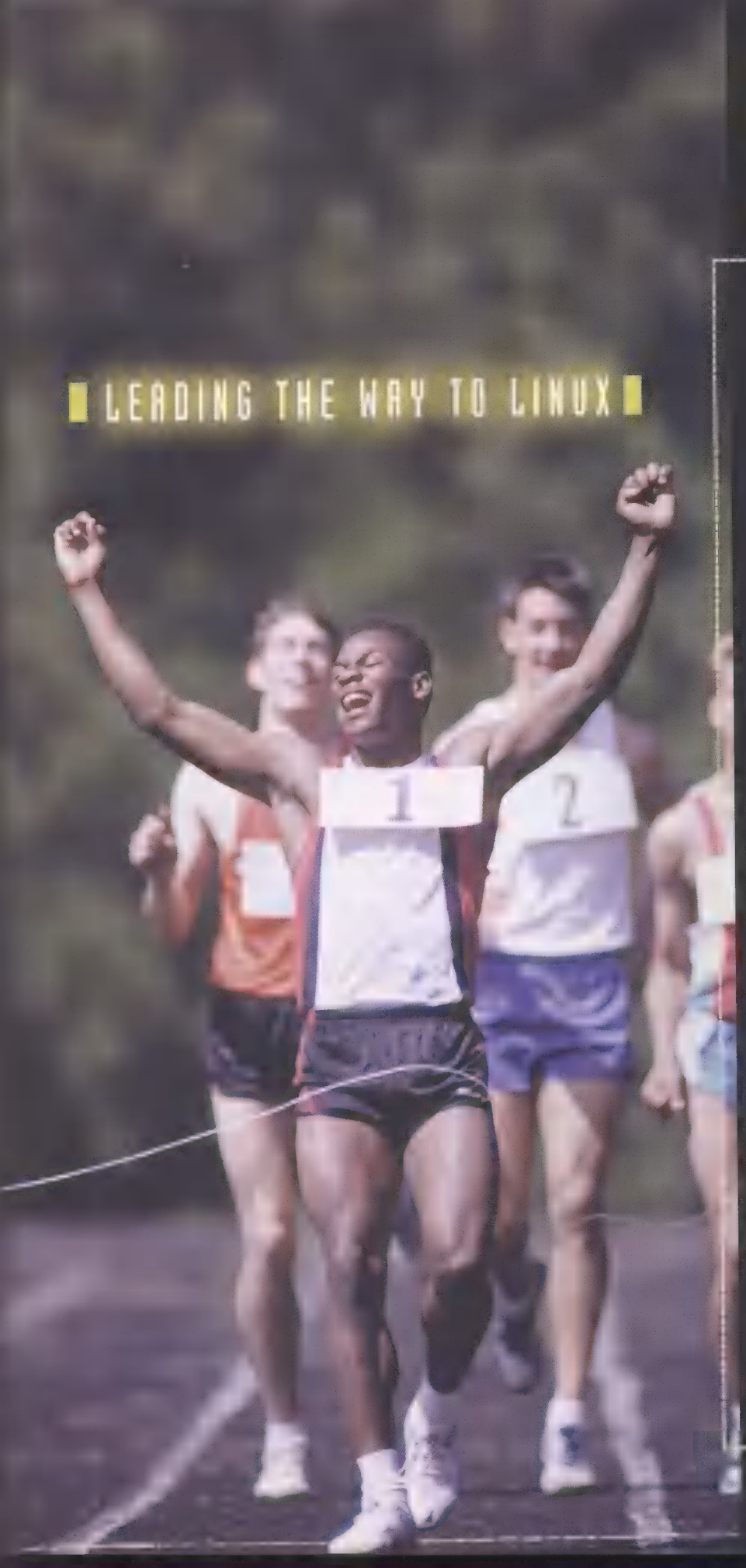
What a bunch of crap. I've just spent the last three days trying to install the *Mandrake* disk I got with your magazine, and it does nothing but freeze my system. Easy to install? Man, that's a good one. Hell, even my Grandmother can install the Microsoft OS! And this is supposed to be the "Windows Killer?" Not when you need six months of night school just to get it on your machine…

The whole concept of Linux taking over is a joke. Maybe this stable new "Wonder OS" can run on a toaster, but I'd be happy if it just installed on my computer.

Cyrus Ravage

I'm a Wanker

Congratulations on your first issue. While some of the graphics are a bit overblown (the vicious looking Tux in particular), I found the first issue a nice alternative to the rather stodgy *Linux Journal*. I also enjoyed spotting hints of your British heritage, most noticeable in the article on loading Linux-



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Mandrake, i.e., "hit the loo" and "loading the boot."

The best articles in the issue were the installation how-to, the networking guide, and the kernel rebuilding guide. They offered advice and solutions to problems that Linux users are sure to be able to use. In fact, I got my computer working as a gateway after reading the ipchains info in the Networking Nice Guy. All in all, I think the first issue of *Maximum Linux* is a very good first effort.

David Hoshor

Editor-in-Chief Bryan Del Rizzo replies: Hey! Who you calling English, bub? I'm Canadian. Cool eh?

World's Coolest Linux Sites Caught on Tape

Hey there. I did a little test. You should too. Go to http://www.netcraft.com/whats and enter www.maximumlinuxmag.com and see what I got: www.maximumlinuxmag.com is running Apache/1.3.0 (Unix) PHP/3.0 on Solaris

Um…I appreciate the fact that you are using Apache...but in my opinion, Linux sites should be running Linux ...right?

David Utidjian

Executive Producer Ed Homich replies: Check it again.

The Good, the Bad, and the Ugly

First some kudos. The first issue of *Maximum Linux* got my experimental Linux box from the "console only" stage to a "pretty desktop with KDE" stage in about an hour. Thank you. The articles were mostly good, and the magazine as a whole was fun to read. Alt.OS was fun and amusing, but nothing more than that–I would've preferred something educational too. The gaming article was way too *Quake* focused, which is great for some people. Unfortunately, first person shoot 'em ups give me motion sickness. Help me find a substitute for *SimCity, Diablo, Warcraft,* or *Kyodai Mahjong* and Windows will be gone from my system much more quickly. Since I want Windows gone quite badly, this is a priority. Keep in mind, these articles were entertaining and/or helpful, just not outstandingly well done.

Whatever you do, please don't imitate Slashdot. I can get Slashdot online for free, and it's automatically more up-to-date than a magazine. Thus, ditch the news section unless you are doing a detailed analysis of what happened (in essence, a thought-added Slashdot). Ditch the pretty pictures of systems that come with pre-installed Linux. If you must do such coverage, do a review or two each month of such lovelies. Better yet would be an "Adventures in Hardware" type column, where a user gets various bits of hardware set up.

Since Linux is getting mainstream, it would be nice if you'd help spread it. Don't just do articles for the experienced user–include plenty for newbies, too. Getting a CD in each issue is a great idea, but having a "how-to" in each issue would be better.

Emily Cartier

Editor-in-Chief Bryan Del Rizzo replies: Thanks for the lengthy letter, Emily. We read every letter that comes across our desktop and take all comments and criticisms very seriously. We're dedicated to producing a magazine that everyone will enjoy reading, but also turn to as a resource in their time of need. To that end, we're a big proponent of how-to articles, and feel they serve a real purpose for beginners and experienced users alike. If you haven't already done so, I encourage you to check out our online network at www.maximum-linux.com. It's chock full of up-to-date news stories, how-tos, and other community features. But as usual, we rely on reader feedback to make sure we're on the right track. Once you've finished reading this issue of *Maximum Linux,* send me an e-mail (editor@maximumlinux.com) telling me what you liked (or didn't like) and what you think we should change or add. *Maximum Linux* is a magazine for the masses, and we'll do whatever it takes–as long as its legal–to make you, the readers, happy.

> "Congratulations for having the courage to begin a publication for an OS that is still, when it comes down to it, not in the mainstream. I feel confident that Linux will enjoy an accelerated take-up over the next few years, and your decision to publish a mainstream magazine for this fine OS will, I'm sure, not prove to be a mistake if you stick with it."

Maximum Linux: Not For Dummies

I read the entire first issue cover to cover (a rare thing for me). Every article had something valuable. Unlike the other Linux magazines, *Maximum Linux* is not over my head. Fortunately it also doesn't "dumb down" the articles and treat the readers like idiots.

Ernie DeVries

I just wanted to let you know I filled in the subscription form for *Maximum Linux* in your first issue. I live all the way down here in South Africa and hope the next issue will reach me soon.

The magazine has the best newbie/guru mix of articles I've seen, and I hope you guys will add even more newbie and guru sections respectively in the future.

Frank Harvie

Grocery Shopping

I bought my copy of *Maximum Linux* at a Winco Foods store in McMinnville, Oregon. Thought you might like to know.

G & J Belt

Still Not Convinced

I just purchased your first issue with the enclosed *Linux-Mandrake* CD. I could hardly wait to get to my home office and give it a whirl. Then I read page 32. Between creating the boot disk from the CD and "scoping the BIOS" along with repartitioning my hard drive, I knew I was in trouble. Mind you, I cut my teeth on C/PM and a TRS80 when learning Basic was a prerequisite to doing anything with it. I currently have two Macs and three PCs in my small office and care for all of them, but the CD is still in the shrink wrap up on the shelf next to "Learn C++ in Three Easy Lessons." The bottom line? Bill Gates can relax. Linux was created by, and is still only for, techno-nerds.

George Broatch

More Tech Talk, Please

Congratulations for having the courage to

begin a publication for an OS that is still, when it comes down to it, not in the mainstream. I feel confident that Linux will enjoy an accelerated take-up over the next few years, and your decision to publish a mainstream magazine for this fine OS will, I'm sure, not prove to be a mistake if you stick with it.

I understand that your first issue was geared somewhat to the more casual, less obsessive faction of the Linux community, and perhaps to those who have yet to make the plunge and move from other, inferior Operating Systems. In this respect, you were successful in providing a good general overview of Linux and an introduction to some key concepts. Nonetheless, I would prefer to see a slightly more technical and in-depth approach in the future. After all, I like to believe that many Linux users have the intellectual ability to handle something a little more complicated than "click here, press that, wait while machine reboots for the fifth time this hour." An in-depth review of the numerous Window Managers out there would also be great: a side-to-side comparison of Enlightenment, KDE, WindowMaker, etc.

> All other Linux magazines look too much like Bash! They're all boring, technical, and bland. *Maximum Linux* brings the excitement of PCs to the Linux community.

I was also pleased to see that you didn't make the mistake of suggesting that Linux was easy. As a bleeding-edge OS that is under constant development, it's important for any potential user to realize that they're likely to have to put in a little more work than they might have expected with, say, Windows.

By and large, though, it's a good effort–a little thin, but I'm sure the content will be fleshed out in future issues. One last thing–do please stick with calling "X" "X"!

George Carless

We're Not Bashful

Your CD was great. I really love it. I'd subscribe to the magazine just for the CD!

All the articles in the first issue were informative. However, I had a very tough time finding the magazine in supermarkets and bookstores. I finally picked my copy up at CompUSA.

I understand it'd be tough to find much advertising, readers, and stories in the early stages of the publication. All other Linux magazines look too much like *Bash!* They're all boring, technical, and bland. *Maximum Linux* brings the excitement of PCs to the Linux community.

Gordon C

Mac Users Unite

I'm a new Linux user and I found your new magazine to be very informative. Unfortunately, you seem to have forgotten an important player in the Linux world–those of us who use Power PC versions of Linux. I use *LinuxPPC* on a Macintosh 233MHz G3 and love it. It was very easy to install and set up. There are a few other flavors for the PPC including *Yellow Dog Linux, Debian, MkLinux,* and a few others I can't recall at the moment. The Mac has become a very important player in the computer world recently. To include PPC-specific content in your magazine would make myself–and a bunch of other people–very happy.

William C. Hall

Mac Addict Executive Editor David Reynolds replies: I agree. And if you turn to page 78, you'll see that your call has been answered. It was never our intent to be a PC-only Linux magazine. It's our goal to have Mac-specific content in every issue of *Maximum Linux*. Let us know what you think of this month's feature.

Giving Bill the Boot

WooHOO and ALL-RRIIGGGHHHTT! It is about time. I bought *Maximum Linux*, read it, loved it, and want more of it! I'm still with Bill, but I want to learn more so I can give him the "boot."

Ian Ball

Books—They Do the Body Good

Congratulations on a good first issue. I am new to Linux, with no programming or tech background–just a strong interest in computers and several years of Mac/Windoze experience. The evil penguin on your cover caught my eye, so I picked up a copy and read it cover to cover. Having read your reviews, I decided to try Caldera 2.2 and have been running it for about a week. I like the mix of articles for newbies and experienced users–I guess you're in a tough spot trying to appeal to both audiences, but I hope you keep running material geared to new users. It's not easy to find Linux info that doesn't assume you're either a moron or a master programmer, and I found your first issue pretty helpful. How about running book and/or Web site reviews?

James Ramsay

Editor-in-Chief Bryan Del Rizzo replies: We're definitely planning to include book reviews sometime in the

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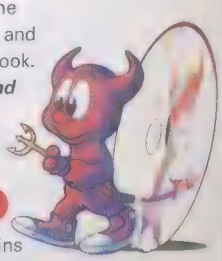

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future, so if there's anyone in Linux land that might be interested in doing book reviews for us on a regular basis, shoot me an e-mail to editor@maximumlinux.com and let's talk.

Aw, Shucks!

Just a quick note to let you know that you are the first editor I've ever written to and that *Maximum Linux* is the first computer-related magazine that I have decided to subscribe to in a long time. I look forward to future issues that are as great as the first. Keep up the great work and thanks again!

Jarrad P. Wilkinson

Picking Up the Slack

I was very impressed with your first issue! If you can keep this formula in every issue, you will be the number one Linux magazine in no time! However, I am wondering why you left out mention of *Slackware*. *Slackware* has always been consistently dependable and its latest release also includes the KDE system (for all of you looking for the "bells and whistles"). You aren't only going to feature Red Hat are you?

My subscription card is on its way. Meanwhile, I'm stuck with the dilemma of wondering if I'm ever going to return my friend's copy or hope he forgets I have it! <GRIN!>

Jeff Ledger

Contributing Editor Rob Hall replies: You slacker! Go buy your own copy of *Maximum Linux* and stop mooching off your friends! Meanwhile, check out page 38 for our review of *Slackware 7.0*.

You Will Be Assimilated

I recently picked up your premier issue, and I was completely enthralled. I've heard friends mention Linux, and I've decided to take the plunge. This should be an interesting journey for me, though, since I know absolutely bupkus about programming. I enjoyed the content of your magazine a great deal. The only suggestion I could make is to have more explanations, for those of us who have had no real computer experience outside of what Bill has shoved down our throats. I know what the word "compile" means, but for a newbie like myself, the thought of doing it to my OS is daunting. Is there a program that can do it for me? If I make a typo, will I cause irreparable damage? The best way I can think of to convert people to Linux? Explain it to them in Windows terms where possible, lead them by the hand where it's not, and let the computer do the rest of the convincing.

Jeremy Coldwell

Subscription Woes

I picked up the first edition of *Maximum Linux*. Thank god—somebody has finally published a Linux magazine that is readable. This is great.

Now, how the hell do I subscribe? There is no link on your main page. Under the Imagine customer service page there is every other Imagine publication but *Maximum Linux*.

Please don't ask me to fill out the little cards in the magazine. I hate the little cards in the magazine. They always fall out at the worst times. In the tub, in my food, or worse, at the magazine store where they always shoot halfway across the room. At home they always get airborne and go behind the couch, and then my wife insists that I get them immediately. Who wants to move furniture when they can read about compiling libraries and hacking kernels? Man, I tell you…some people have pretty screwed up priorities.

John E. Hagensieker

> "The whole concept of Linux taking over is a joke. Maybe this stable new "Wonder OS" can run on a toaster, but I'd be happy if it just installed on my computer."

Lead Online Designer Sherry Monarko replies: Check out our new Web site at www.maximumlinux.com. We've overhauled the entire site, and we hope you'll find things just as interesting as the magazine. Subscription links are duly included, too.

No More Microsoft Bashing

I am writing to put my two cents in on this whole Microsoft bashing crusade that seems to be prevalent in your magazine, and in fact in any Linux circle.

I use Microsoft software all the time. I do software development using *Visual Studio* and administer the network here at work (for e-mail, Intranet, and Help Desk), so I could say that I know a thing or two about Microsoft's software.

As far as Linux is concerned I can honestly say that I am a "newbie" at it. I have tried installing several copies—some successful, some not. It is an excellent OS, but there's still a lot you can't do with Linux.

People do not buy computers because of the OS—they buy them because of what they can do with them! When is the Linux community going to take some of its constructive criticism they have for Microsoft and put it to good use? Anyone who has some experience using computers will tell you the same thing: If there was something that would allow me to run any Windows program inside Linux then people would be lining up to pay hundreds of dollars for this application or plug-in that would allow them to run their Windows apps.

Of all the people currently buying computers with Linux installed, how many are still happy six months down the road? If they were used to using Windows as their desktop, I'm betting they wouldn't be happy at all.

Daniel C. Landon Jr.

This month's reader award goes to Abraham Chapman for his heartfelt search for Maximum Linux. A cool t-shirt is on its way!

I purchased a copy of *Maximum Linux* at the Century City shopping mall in Los Angeles, CA. I liked the magazine so much I went to the store after my classes at Beverly Hills High School every single day for the past three months in a failed attempt to obtain the second and third issues of the magazine. *Maximum Linux* is not being sold within a five-mile radius of the Century City shopping mall. I know this because I have walked to every single magazine store in that radius.

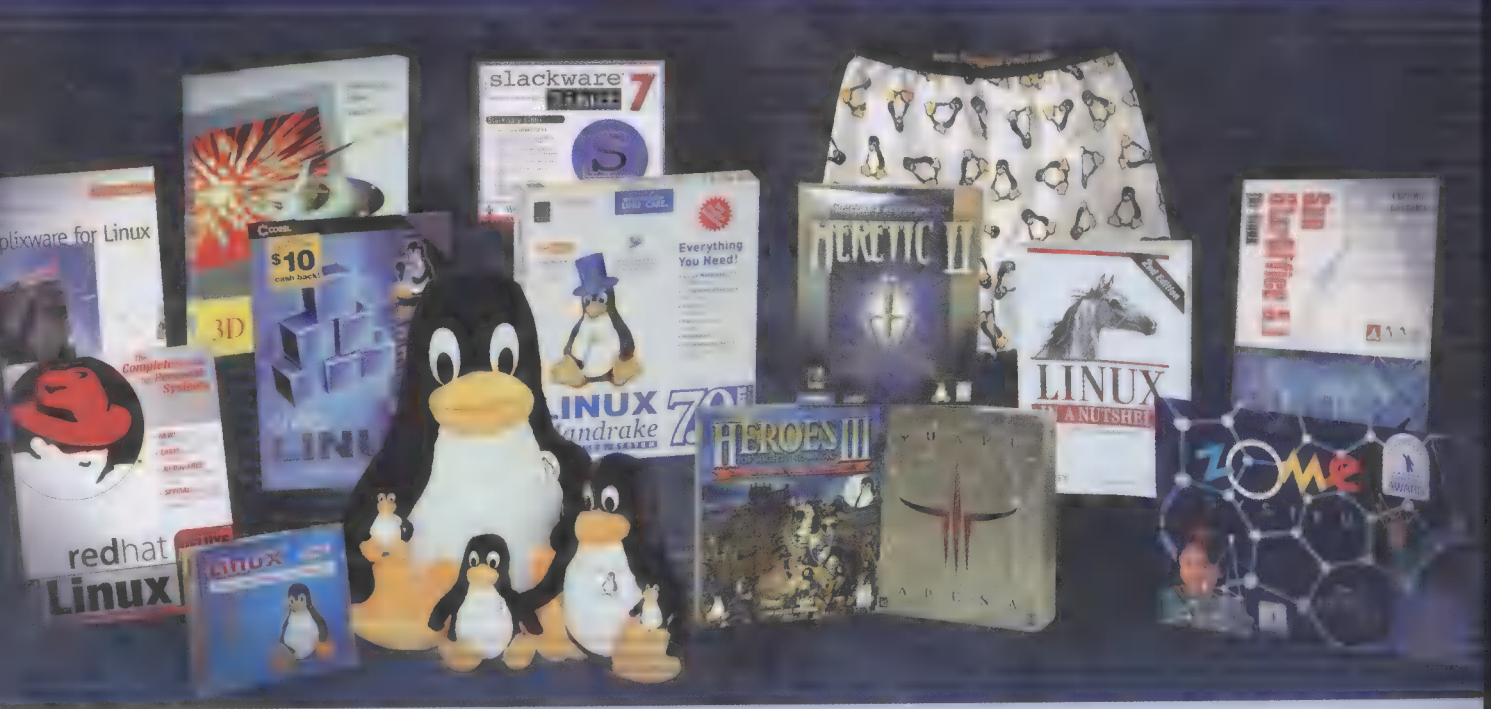
Unfortunately, I am a teenager without a car, license, bike, job, or allowance. I am barely able to scrounge up enough money to buy a single issue a month and cannot afford to get a subscription. Please start selling Maximum Linux again in the newsstands within my walking radius.

Thank you.

Abraham Chapman

News | Resources | Partnering | Fun | Shopping | Events

SATURDAY AFTERNOON AT THE MALL.



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STALLMAN
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REBELS WITH A CAUSE

Meet the new revolutionaries, the faces behind Linux. Linus Torvalds, R.M. Stallman, and Eric Raymond tell us why liberating yourself from the death grip of giant corporations is your path for personal salvation.

by Cotton Ward

What happens when the worlds of Open Source software and commerce collide, and programmers who give code away come into contact with programmers who sell code for profit?

The question first arose when Red Hat sent out at least 1,000 e-mails last year to software developers who'd contributed to certain Open Source products, and offered them shares in the company's original flotation. Unfortunately, the shares were only available through discount brokerage E-Trade, required a $1000 deposit, and at least $1200 to buy a 100-lot of shares. Needless to say, many people couldn't afford the initial down payment and missed out on the rich opportunity.

We decided we had to find out more: How did people feel about seeing their freely donated code appearing in commercial products? Was there any chance of this heralding—even in a small way—the beginning of the end of the Open Source/free software dream? The results surprised us.

We began by posting questions to two newsgroups, comp.os.linux.advocacy and alt.os.linux—to see whether people were happy or disgruntled with Red Hat's IPO and whether they think the company still encourages "Open Source" principles. Instead of being deluged by hundreds of hacked-off hackers, we only received two responses, both from people who hadn't been involved in the IPO at all.

This was encouraging for the Open Source movement, if not our hopes for a lively story. So we asked some of the industry heavyweights what they thought about Red Hat's IPO process and the company's influence on Open Source principles instead.

IN IT FOR THE MONEY?

First up, of course, is Linus Torvalds, the former Helsinki University student who began developing the Linux kernel in 1991. He used the Free Software Foundation's toolkit while many other Net hackers also contributed to the development of Linux. Torvalds said he scored some shares in Red Hat, but said "it did not make me ridiculously wealthy.

He defends the rights of companies such as Red Hat to exist. "The commercial ventures have been critical to the success of Linux. The reason is that they work in a completely different dimension. The 'hardcore' development that happens on the Internet tends to focus on fundamental problems, performance, and on the technical details. That's not something that most commercial software houses necessarily want to do at all. What the commercial side brings is ease of use, 'polishing', 24x7 support contracts, and distribution–all the small details you need to be successful, but which aren't really all that exciting."

Linus Torvalds, creator of the Linux kernel

He says he's not worried about Red Hat being overly dominant in setting standards. "I think the U.S. is mainly Red Hat-oriented, and many people don't see that Linux is much more than Red Hat. Yes, Red Hat is big, and it'll grow bigger still, but so will a number of other Linux distributors, and nobody really controls the market. One of the points of Open Source is that you can't ever unilaterally control the market, because even the extensions will always be available to others."

He points out that the concept of Open Source to Linux users is so important because it "keeps control in the user's court". He adds, "Whatever happens, Open Source means that you can always fix whatever issues plague you." But what about the various strong personalities, though, who all have to work together?

"Egotistical people doom themselves. If you don't play together with others, you don't get the benefit of co-operation, and you'll end

WHAT IS OPEN SOURCE?

Open Source is a name given to software developed by programmers, peer-reviewed by other programmers, then distributed for free to anyone who wants it. The code is owned by the Open Source community as a whole and is therefore non-proprietary. The advantage over commercial software development is that code can be written and fixed faster and is often better-written. Open Source-type software has its roots in academia and been around for as long as the modern computer, but many feel that the rise of commercial software concerns, proprietary standards, and patents is a threat to the health of computer science. The rise of the Internet has allowed talented programmers to form online cooperatives–which are large enough to compete with commercial concerns.

up being just another person in a world where there are hundreds of competitors willing to do better."

DEATH OF A COMMUNITY

Next up, we contacted Richard Stallman, who first began working at the MIT Artificial Intelligence Lab in 1971, when sharing software was the norm and everyone pitched in to improve programs. But when proprietary software was introduced in the late 70's, frustration set in. "We did not have to sign non-disclosures for the binaries," Stallman recounted, "but it was impossible to get the source for that program if you did not."

Open Source movement evangelist, R. M. Stallman

The last straw was when someone refused to give Stallman and the AI Lab the source code to control the printer, and he decided he never wanted to treat someone else in this way. He left MIT in 1984 to develop a free UNIX-like operating system and the Free Software Foundation and developed the GNU General Public License (GPL).

"I hope this magazine won't repeat the usual mistakes, such as: 'Linux is an operating system that was developed in 1991 by Linus Torvalds'," Stallman points out. "In truth, Linux is a kernel; the operating system as a whole is basically the GNU operating system, which we in the GNU Project started developing in 1984. In 1991 it was almost finished, missing only the kernel. People put it together with Linux to make the combination GNU/Linux, which is the system people use."

"Most users don't realize this, because they typically hear the whole system called 'Linux'. So they don't realise that the GNU Project was the origin of this system, and that our idealism made it happen. I hope you'll give us equal billing by calling the system GNU/Linux. It's an important point."

He didn't get any shares in Red Hat's IPO. "What happened with Red Hat shares is a side issue of a side issue. What Red Hat does with a small fraction of its stock won't make a major difference to our community's future. The most important question about Red Hat is, will it contribute to building the free software community or weaken it?

"So far it has done a substantial amount to help build the community by hiring people to develop free software. But it has also done things that weaken the community, such as including non-free software, in varying amounts, on most of its CDs."

Stallman continued, "Red Hat is just one of many companies that will affect our community. How much companies help build our community, and how much they weaken it, will depend on what we are prepared to accept from them. It will depend on our values. How much do we want freedom, and how much are we willing to give it up for other things such as convenience? And when companies market non-free software to us, will we reward them with our custom or deny them success?"

> "You don't win a battle by asking, 'Will we win?' You win it by doing your best to win."
> – R M Stallman

Stallman points out he has declined to join the Open Source movement. "This was because it only talks about strictly practical values, such as convenience and reliability, and studiously avoids raising deeper issues, such as freedom and principle. That makes its philosophy painless and easy to sell. I think freedom and values are important, and should not be hushed up. I belong to the Free Software movement, where we encourage people to think about those issues.

"The Open Source people have a right to promote their views, but the Free Software movement, which launched the system people call 'Linux', is still here, and the two movements are different."

THE PATENT CRISIS

The biggest current threat to the Free Software movement is software patents. If you start getting patent infringement lawsuits for including a "Save As" command or using different colors to show different items, you'd never be able to afford the legal defense costs. "The battle is just beginning, and it will take time," Stallman says. "You don't win a battle by asking, 'Will we win?' You win by doing your best to win. Good citizenship means taking the side you think is right, not the side you think will win."

He says it's important for Linux users to lobby against trivial and broad software patents being introduced here and abroad. "Most countries have their own independent patent systems, so the issue is usually decided on a country-by-country basis." He recommends supporting any Free Patent Web sites that may exist in your home country.

"I advocate legally exempting, from patent infringement claims, the use of software installed or installable by the user on general-purpose computer hardware, when the hardware itself does not infringe, and the idea that is patented is in nature a matter of computation or processing." He says we also can promote the issue of free software by discussing it. "The more you talk about it, the more you show people that it can and should be done."

Enter Eric Raymond

Meanwhile, high-profile Internet developer and writer Eric Raymond says his research has helped explain the decentralized Open Source model of software development. His own projects include one of the Internet's most widely-used e-mail transport programs, and his essay 'The Cathedral and the Bazaar' inspired Netscape to make its source code freely available.

Open Source advocate, Eric Raymond.

He's also renowned for getting hold of and annotating two internal Microsoft white papers on the company's attitude towards Open Source software, which are referred to as the "Halloween Documents".

Commerce is cool

Eric managed to snaffle a few Red Hat shares after "getting through the maze of idiotic SEC requirements" but pointed out that generally he gives his software away "in the knowledge that outfits like Red Hat might use it to make money." He adds, "I'm cool with that notion." Raymond also co-founded the Open Source Software Group because of concern that the Free Software Foundation's anti-business undertones were hindering the spread of the message.

However, the two groups happily coexist. "The Open Source community needs healthy distribution companies, such as Red Hat, with strong capitalization and Wall Street's respect, to accomplish what we're really after–replacing the present software infrastructure with one that doesn't suck.

"I think there has been a lot of smoke blown about Red Hat setting standards unilaterally, but very little fire. As long as they're not even trying to stop outfits like CheapBytes from reselling their distribution for $1 a pop, there isn't any problem with market domination."

Breaking monopolies

He says the concept of Open Source is important to "anyone who never wants to see a Blue Screen of Death again. Open Source has turned out to be the only way to produce reliable, high-quality software consistently. It's the only way to produce software that evolves fast enough to stay current in Internet time. Also, Open Source puts the power where it belongs–in the hands of individuals and software users, rather than corporate monopolies and software vendors".

He doesn't think Microsoft will ever release any Windows code. "I doubt it, and I don't think it matters much. We're already ahead of Microsoft in everything but marketing. I don't think it'll be able to catch up with us, even if it goes open."

From the other side of the fence, we spoke to Cygnus Solutions' co-founder Michael Tiemann. Cygnus is the largest Open Source-based company and started trading in 1989. Its biggest-selling product is the GNUPro Developer's Kit.

"The reason there is so much Open Source software available today is because motivated programmers have access to world-class development tools that are being continuously improved and supported by Cygnus," Tiemann said. "Linus Torvalds has written about the importance of the GNU compiler. What he basically says is that the portability of the kernel is not due to any particular intelligence on his part, but due to the awesome capabilities of the GNU compiler. Compilers and development tools are not sexy in the way that operating systems are sexy, but they are every bit as important to getting apps to market."

Tiemann admits his name is "all over" the GNU C++ source code and he continues to submit bug-fixes to GCC, G++, and GDB, but he hasn't "done any actual Linux kernel work," so didn't get any Red Hat shares. "I believe they scanned only Linux kernel sources to find 'friends of Red Hat," he speculates.

He disagrees that people who contributed to the development of Linux should have been given shares without having to pay cash up front. "This would probably violate tax and securities laws in some countries. I think Red Hat did the right thing by using existing mechanisms. A wise person once said 'one revolution at a time'; I think Red Hat is following this maxim to the letter."

Positive reactions

As for Red Hat's detractors, Tiemann remarks: "I think there are a few loud voices that do not appreciate all the good things Red Hat is doing. I guess there will always be anarchists who despise structure and organization. I hope that some day we will be profitable enough to do some amount of community-oriented work. I really wish I had $100B to give to charity."

As for the likelihood of Microsoft ever releasing any Windows code, Tiemann says the chances are pretty remote. "I consider it as likely as a 9.8 earthquake destroying all of San Francisco. If it happens, it happens." And no, Tiemann doesn't currently live in San Francisco.

> "Open Source puts the power where it belongs–in the hands of individuals...rather than corporate monopolies."
>
> – Eric Raymond

THE PLAYERS

Linus Torvalds is the creator of the Linux kernel (that is, the code that sits at the heart of Linux and controls most of the basic processes). He started work in 1991 under the aegis of the GNU Software Project whose founder was...

... R.M. Stallman. His GNU manifesto, created in 1984, helped kick-start the Open Source movement. The aim was to develop a universal operating system–which was not owned by any commercial concern and could be adapted by anyone who wanted to. GNU/Linux was the result. GNU/Linux is the full title for Linux, although in the interest of readability we have shortened the title to Linux elsewhere in the magazine.

Eric Raymond is a well-known Open Source programmer and advocate whose writings have helped influence a number of commercial concerns to adopt the Open Source model of development. His key work "*The Cathedral and the Bazaar*" is available from [illegible] or booksellers everywhere.

The Browser Crisis

PROBLEMS WITH NAVIGATOR COULD POSE LINUX'S MOST SERIOUS THREAT

My friend Charles, a lawyer here in Los Angeles, recently called me to announce the unthinkable. "I finally bit the bullet and uninstalled Linux," he reported, giving me just enough time to avoid choking on my sandwich. UNinstalled? What happened to the Desktop Revolution? Had the Redcoats intimidated him from even considering separating from the motherland?

"I just got fed up with *Netscape* crashing," said Charles. "I can't be productive without a stable browser. I have no problems with the very same product under Windows, and if I use Windows there's *Internet Explorer*, which is more advanced."

Charles is not alone. Fact or fantasy, it's not difficult to find reports of *Netscape* simply vanishing from the screen, hanging machines, and even erasing entire hard discs. Users of both Linux and Windows have long complained about the poor condition of *Netscape*, as Microsoft inexorably gobbled up its market share. An increasing number of users complain that Web sites are only being designed to work (or as the paranoid might believe, are being designed to work only) with *Internet Explorer* on Windows.

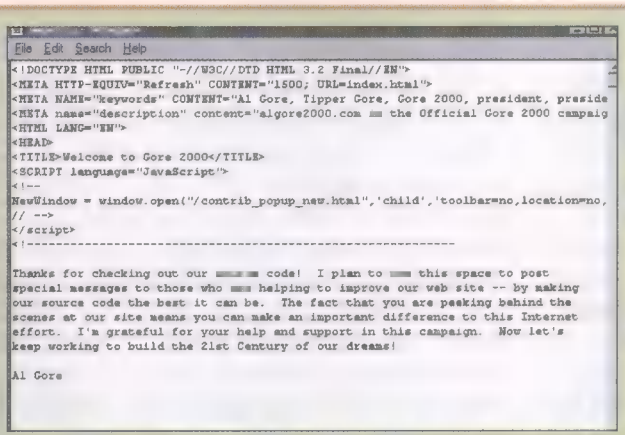
Not so long ago, an operating system without a good spreadsheet and word processor was unthinkable. Today, the browser is often more important than any other application. No wonder there is genuine concern that lack of an equal to *Internet Explorer* will keep hundreds of new users away from Linux.

Java is frequently blamed for these problems. Currently embroiled in struggles between Microsoft and Sun, as well as an on-again, off-again relationship between Sun and international standards organizations, Java is failing to deliver on its promise to be a platform-independent language. In a recent court document, Bill Gates reluctantly granted that Microsoft does not see the language itself as a problem, but work to create Java environments for other operating systems and hardware platforms clearly threatens Microsoft's desktop hegemony. Standard operating procedure for the

Illustration by Scott Peck.

The World According to Gore

Presidential Candidate Al Gore's campaign has taken Open Source to new political heights. Of the major presidential candidate Web sites, his is the only one running Linux, according to a study by Keynote (check out www.keynote.com for all of the candidates' Web addresses). According to the study, George W. Bush's and Gary Bauer's sites ran Microsoft's Internet Information Server 4.0. The other candidates used Sun Solaris boxes. PC Data Online (www.pcdataonline.com) reports the Gore site is attracting over 10,000 visitors a week.



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File  Edit  Search  Help
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<META HTTP-EQUIV="Refresh" CONTENT="1500; URL=index.html">
<META NAME="keywords" CONTENT="Al Gore, Tipper Gore, Gore 2000, president, preside
<META name="description" content="algore2000.com [illegible] the Official Gore 2000 campaig
<HTML LANG="EN">
<HEAD>
<TITLE>Welcome to Gore 2000</TITLE>
<SCRIPT language="JavaScript">
<!--
NewWindow = window.open("/contrib_popup_new.html",'child','toolbar=no,location=no,
// -->
</script>
<!-------------------------------------------------------------

Thanks for checking out our [illegible] code!  I plan to [illegible] this space to post
special messages to those who [illegible] helping to improve our web site -- by making
our source code the best it can be.  The fact that you are peeking behind the
scenes at our site means you can make an important difference to this Internet
effort.  I'm grateful for your help and support in this campaign.  Now let's
keep working to build the 21st Century of our dreams!

Al Gore
```

Al Gore's staffers encourage you to look at the site's source code.

But Gore's savvy staffers have provided something none of the other e-politicos considered—an Open Source invitation to programmers peeking at the source code. "Thanks for checking out our source code!" says the Gore site. "I plan to use this space to post special messages to those who are helping to improve our Web site—by making our source code the best it can be."

"big boys" of the computer industry has always been to embrace a standard and then "enhance" it with just enough features to encourage customers to avoid the competition's flavor. Microsoft's Java (like its other languages) deviates significantly from the standards to take advantage of the Windows/*IE* environment. This seems logical, until you attempt to browse a site that expects W/IE and refuses to give anything else the same level of service.

Many designers contribute to this problem by including a "Best Viewed With (insert vendor's name here)" notice. If these notices are more than simple attempts to gain vendor brownie points, one must suspect that the sites employ features unique to the browsers they favor. In other words, "Best Viewed With" means "deviates from the standard." Netscape Communications did this in the mid-90's by implementing extensions of HTML standards prior to its adoption by the Internet Engineering Task Force and the World Wide Web Consortium (W3C). The extensions became so influential that when a non-Netscape browser was detected, the extensions were turned off.

Browser plug-ins–essentially custom client programs downloaded to your computer to enhance your browsing experience–are another major problem for alternative environments. Smaller software manufacturers find it expensive and difficult to support an increasing number of environments; many did not survive the transition from the Amiga or DOS to Windows and Mac OS. Nevertheless, larger manufacturers such as Macromedia are now beginning to release Linux versions of their products. As long as Linux continues to grow and mature, this problem will eventually go away.

Less widely understood are major new developments in e-commerce and business communications that will fundamentally change the nature of the Internet and Web standards. Most important among these is the W3C's Extensible Markup Language (XML), which is likely to take over many different kinds of communications, from personal Web pads and pagers to bank transactions to publishing. The XML family of languages includes a growing number of standards which are being customized and extended throughout industries formerly untouched by the Web.

For example, clothing manufacturers could develop a standard set of tags describing their products and raw materials. The tags would not only serve to format a Web page and support e-commerce, they would also form the basis of business transactions entirely outside the Web. XML pages are dynamically formatted by separate style sheets, so they can appear in a format appropriate to the individual viewer, even in Braille. In this way, XML standards may be less susceptible to the browser monopolists and the demands of today's graphically oriented Website designers, who routinely ignore spelling, grammar, and good writing.

Most recently, the W3C announced XHTML-HTML implemented in XML. Mozquito.org has already released an XHTML authoring environment. As a strategic bridge to the future, XHTML is brilliant. It provides a means of retaining backward compatibility with millions of HTML documents while transitioning the Web to an extensible, device-independent future. Hmm, where have we heard this before?

To anyone who has worked in a serious tagging environment such as XML's progenitor, SGML, or *Corel Ventura* (hopefully coming soon to a Linux PC near you!), these developments come as a relief. Even a casual glance at HTML code shows that it is often a mess. In attempting to turn a sow's ear into a visual Louis Vuitton accessory, Web programmers have been forced into one kludge after another. With the broad family of emerging XML languages, covering multimedia, graphics, television, mathematics and security, there is an opportunity to rewrite the Web to better realize its promises.

Most people (and far too many Web designers) have no idea how many browsers really exist. Dozens. And dozens. For all kinds of hardware. There's a growing number of "front ends" to the guts of *Internet Explorer*, providing specialized interfaces and other enhancements (similar to "skins" for Windows). Then there are many browsers written only for a particular

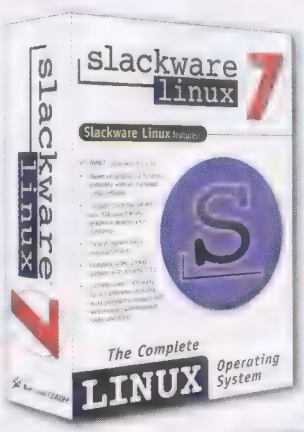
⏭ p. 32

Over One Billion Served!

A new study shows that the World Wide Web now has more than one billion unique indexable pages. Inktomi and the NEC Research Institute built the WebMap database over the past few months using a 100MB/sec Ethernet connection. Every URL in the database is associated with properties such as rich media files and pornographic content (or lack thereof, we presume). You've used Inktomi's database if you've searched the Web on portals such as America Online, CNET, or Yahoo.

Number of servers discovered: 6,409,521
Number of mirrors in servers discovered: 1,457,946
Number of sites (minus mirrors): 4,951,247
Number of good sites (reachable over 10 day period): 4,217,324
Number of bad sites (unreachable): 733,923

slackware® linux



Slackware® Linux 7 features the ***fastest, easiest*** Linux installation ever! It is based on the industry-standard glibc-2.1.2 library for complete application compatibility with all of the latest Linux software. Slackware includes ***both the GNOME and KDE desktop environments*** so novice users can use the system quickly and effectively. This release features cutting edge video hardware support with XFree86 3.3.5. You get ***over 2,000 Linux applications***, including word processors, spreadsheets, web browsers, development tools, and more.

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Linux Sales on the Rise

IDC REPORT PROVES PENGUINS PROLIFERATE

Anyone who thought that penguins were nothing more than overdressed birds doomed to wallow in the icy barrens of Antarctica can think again. It appears that these so-called flightless birds are making Canada Geese look like Sunday drivers.

For the last few years or so, industry prognosticators believed the Linux would waddle along for a few years, a technical curiosity for geeks, but never for the masses. Surely it could not compete in the long run with serious products from major vendors. International Data Corporation (IDC), a leading information industry research firm known for its detailed reports, previously guesstimated that Linux might make it to numero 2 in terms of sales by the year 2003. Then a flurry of press reports across the industry and even on general newswires quoted a report by IDC analyst Dan Kusnetzky showing that Penguins can puff themselves proudly–Linux was already number two in 1999! However, when *Maximum Linux* contacted IDC for further comment, we were, shall we say, rebuffed.

"IDC does not give its research away, except for a few tidbits," Mr. Kusnetzky said. Our attempts to extract more information were unsuccessful, but it turns out the news leaks didn't come from IDC in the first place. It appears that one of IDC's clients paid good money for their research, then turned around–twice–and released the specs to the media. Sounds like a surreptitious Penguin operative at work! A bird seized with an evolutionary drive to let the world know that 25% of all server operating systems sold are now feathered! Or at least to lay an egg on Microsoft's doorstep.

PC/Client Operating Environments – Preliminary 1999	
Windows 3.x/9x	66%
Windows NT Workstation	21%
Mac OS	5%
Linux	4%
DOS	2%
Unix	1%
Other	1%
Total Shipments	98.6 million

Server Operating Environments, Preliminary 1999	
Windows NT	38%
Linux	25%
NetWare	19%
Unix	15%
Other	3%
Total Shipments	5.4 million

Source: IDC

Got a Browser? You Got Linux!

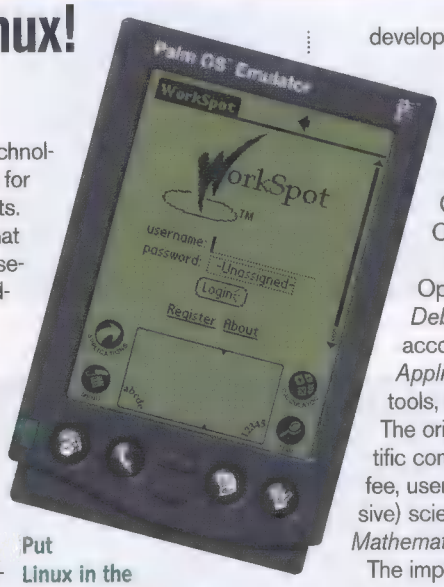
VIRTUAL LINUX SOON TO BE A REALITY

Maybe you use Linux all the time, but the friend you're visiting doesn't. Wouldn't it be great if there was a spot on the 'net where you could get your Linux work done, no matter what equipment was available? Now that would be heavenly.

But the vision actually appeared to seven friends at a New Year's party in December 1998. Obviously filled with high-quality good cheer, they saw that by running a framebuffer in a browser, any user could have a virtual Linux PC. No faith was required. All you needed was a Java applet (the "viewer") and an Internet connection.

In January 1999, the friends formed the Palo-Alto-based WorkSpot, Inc. so they could collaborate on fun projects. Now their full-time task is to make WorkSpot's virtual Linux available to anyone with a browser. The word spread, and so many have believed in the vision that sign-ups were put on hold in March while WorkSpot co-located to Above.net.

Curtis Brune, VP of Engineering, says WorkSpot's Virtual Network Computing technology is based on the Remote Framebuffer Protocol, a technology designed for very thin clients. This means that not much horsepower or hardware is required at your end; it's mostly at the server. An RFB server waits for input from a mouse or keyboard, then sends only the pixels necessary to update your screen. Not only can you access Windows, MacOS, and more than twenty other OSes on each other as long as they run a browser, but you can interrupt the session and continue on a different type of client machine–the very vision of platform independence! VNC was developed by the Olivetti Research Laboratory, which was acquired by AT&T (also in January 1999–obviously an inspirational moment) and recently jointly funded by Oracle as AT&T Laboratories Cambridge.



Put Linux in the palm of your hand.

WorkSpot has modified AT&T's Open Source viewer, and runs *Debian Linux* on its servers. Free accounts will offer *StarOffice*, *Applix*, *Gimp*, various programming tools, plus a small amount of storage. The original target market is the scientific community. For a small monthly fee, users will also get high-end (expensive) scientific applications such as *Mathematica*.

The implications are enormous. Beyond offering the freedom to run any environment on any hardware, WorkSpot is talking with the leading distributions, so its users can also choose to run full working copies of *Corel*, *Caldera*, or *Red Hat*. Major ISPs will be able to offer WorkSpot to their subscribers, and because WorkSpot has a wireless division, you can access the same desktop from your Palm VII.

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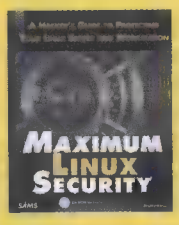

Looking for expert information on Linux use, programming and development? Turn to ***Sams*** for valuable books that offer tips, hints and solutions for first-time users, advanced professionals, and everyone in between.

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Penguins On Credit

LINUXFUND.ORG GIVES BACK TO OPEN SOURCE MOVEMENT

"Revolutionary Credit." That's the mission of LinuxFund.org, a tax-deductible charity established last year to create scholarships and grants for Open Source software developers. Its founder and Chief Executive Penguin, Benjamin Cox, was fresh from university and looking for a way to contribute to the revolution when his friend, Mike McLagan, suggested that he raise money for Open Source software by establishing a credit card. And not just any card. An MBNA MasterCard approved by Linus Torvalds, who held one up during his keynote speech at Comdex '99.

Cox established the relationship with MBNA after approaching ten different banks. "MBNA's offer was the best," he said. "They benefit by attracting a new set of customers, and they were very surprised by the quality of applicants asking for the Penguin card." Credit cards offered with another brand attached are called affinity cards. Banks make such huge profits from the cash flowing through their financial pipelines that donating a fraction of a percent of each transaction to an affinity partner is simply good business. Affinity partners gain exposure, provide their supporters with the ability to direct bonus funds to a particular cause, and benefit financially.

As a result, a portion of every purchase made with a LinuxFund credit card is invested in the fund–at no cost to the cardholder–earmarked to help fund Open Source software development. A Canadian version of the card was recently unveiled, with a European card planned for the near future.

It took Cox about six months of constant negotiations and preparation before he could sell his first LinuxFund card. In three months, the fund will begin giving money away. If Cox can achieve his goal of 100,000 cards, the Linux Fund will be able to support several million dollars a year in grants and scholarships.

Based in Portland, the Linux Fund will disburse $25,000 in scholarships this year to encourage the best hackers to stay in school and get degrees. Recipients will be selected on the basis of creativity and commitment to the Linux/Open Source community as well as academic performance. Applicants will build a resume of the software they have released under an Open Source license or work they have done to benefit the Open Source community.

The fund is managed by three boards. Cox heads the Board of Directors, whose responsibilities are limited to marketing and fund-raising. The Development Fund Board, headed by Mark Willey, has complete control over the grant process, and a Corporate Advisory Board gives non-binding advice throughout. Corporations can donate cash directly or offer a discount to Linux Fund cardholders. The Fund will also accept donations of hardware for its development projects or for schools.

Earlier this year, the Linux Fund found a corporate sponsor in Ecrix, a manufacturer of tape backup systems. Together, they announced OpenTape.org, a non-profit Web site providing technical information about Open Source data storage and backup solutions. The site offers news, a discussion board, and links to storage and backup vendor sites. Advertising revenues from the site will be contributed to the Fund.

One unfortunate coincidence occurred just days away from Cox's application for a domain name. The Linux Fund, as in dot-com, was established to provide investors a way to participate in new Linux startups. Two sites with very worthy goals. But as far as we could determine, neither site mentions the other.

To harness the power of the penguin for yourself, check out linuxfund.org online or call 503-892-3333 to apply over the phone. Tell them *Maximum Linux* sent 'ya. You'll be glad you did, especially once you realize you're now a contributor to the Open Source movement. Call now...operators are standing by.

▸▸ Browser Crisis continued

platform, such as the Amiga.

If you design Web sites, you should become familiar with text-only browsers such as *Lynx*. These are not only essential for users running DOS or other character-based user interfaces, but some use them to foil the advertising glitz which makes so many Web sites resemble the Las Vegas strip. Wise Websters will run their designs through several browsers, both graphical and textual, ensuring they can be effectively used in less sophisticated environments.

The hardest browser battle yet may be trying to get former *Netscape* users back to Mozilla. Three products to watch are *Mozilla*, *Opera*, and *Amaya*.

Now at Milestone 13, *Mozilla* (an Open Source browser based on *Communicator*) is said to be stable enough for daily use, but many users feel it's just taken too long to get even this far. With a moving target like Web technology, they wonder if an army of scattered volunteers can ever catch up with Microsoft? Christopher Blizzard, a spokesman for Mozilla.org, says the team insists on "platform parity, meaning that the browser must work equally on Windows, on the Mac, and on Linux." It has taken time to sort out legacy code from *Netscape 4.x*., but the latest version is entirely fresh code, much of it JavaScript. Like *Internet Explorer*, *Mozilla* is a set of components that can be used in other applications. There's an ActiveX control for Windows, and a GTK widget to embed the browser on Linux.

Mozilla's support for XML is ahead of the pack. The entire user interface uses a descriptive language called XUL. XUL describes the layout of the browser and contains the JavaScript that drives it. "The look and feel of the browser uses CSS (another XML standard) as its language," says Blizzard.

Norway's Opera Software is also willing to give it a shot. Its shareware browser–dubbed *Opera*–is not only designed to run on minimal hardware, but boasts features for the handicapped plus support for XML and XHTML. The Linux version is now available as a "Technology Preview."

Finally, *Amaya* is the W3C's browser/editor used to test the latest Web concepts and data formats. Together with its Jigsaw site server, *Amaya* shows what the Web was intended to be, and may still become.

Let's hope that day comes sooner than later.

–Reported by Malcolm Dean.

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Testing Policy:
Our product evaluation process is built on down-and-dirty, hands-on testing. Our final verdicts are based on benchmark results, where applicable, and a subjective appraisal of product features.

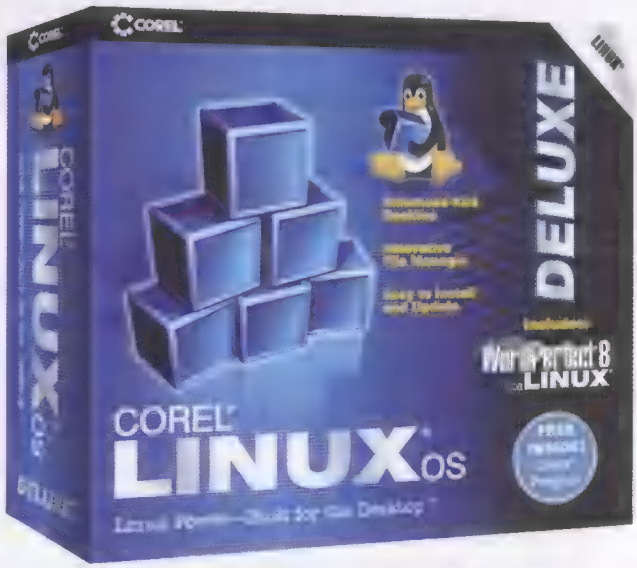
Review Ratings:
Our product reviews are rated on a scale of 1 tp 10. The higher the score the better. Ratings look like this:

Editor's Choice Award
Only products that receive a 9 or 10 verdict can be awarded our coveted Power Award, the only true mark of Linux excellence:

Corel Linux OS 1.0

SHOULD CORRAL NEW USERS A PLENTY

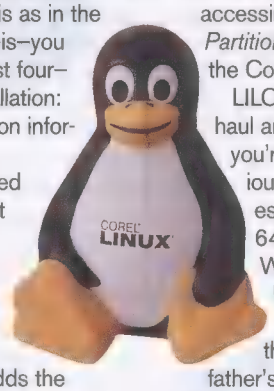
With a spiffy four-step install, a tweaked KDE desktop, and a slimmed-down package list, *Corel Linux* is aimed squarely at Microsoft defectors and those interested in having a pudgy penguin as their longtime companion. But with Joe Windoze as its target audience, Corel has cut the standard distro to the bone in an attempt to ease the Linux culture shock. You won't find sixteen different text editors, but what you do find rocks.



Corel Linux comes in a variety of flavors, but the "Deluxe" version is the only one that comes with telephone support and (its best feature) your very own penguin mascot.

Based on the *Debian GNU/Linux* distribution, Corel brings the 2.2.12 kernel, Xfree86 3.3.5, glib 2.1, and KDE 1.12 to the table. However, if you're looking for the Linux software equivalent of the kitchen sink, you won't find it here. Corel has streamlined the package list striving for "usability, consistency and feature completeness" (their words, not ours). Still, those new to Linux more than likely won't notice anything missing or remiss.

Installing Linux used to be about as fun as getting your wisdom teeth yanked by a sado-masochistic dentist. Thankfully (after all, we try to avoid pain and bloodletting), installing *Corel Linux* was a breeze. Drop the CD into the drive and the autorun wizard kicks in, offering to make you a boot floppy. After assuring you that "installing *Corel Linux* is easy," the system reboots to begin the install. And what an install it is. Corel's Install Express sets a new standard for slick graphical installs. You don't get to play Tetris as in the Caldera install, but–trust us on this–you won't have the time. There are just four–count 'em–four steps to the installation: "User name," "install type," "partition information," and "confirm install."



The default installation is dubbed Desktop but unfortunately doesn't include any development tools or libraries. Our guess is that Corel is banking that the average user would rather use Corel Update than install software from source. "Desktop Plus" (ooh… catchy) adds the development tools, while the Server option installs ProFTPD, Apache, qmail, Samba, NFS, and DHCP servers. A standard "custom" install is included as well.

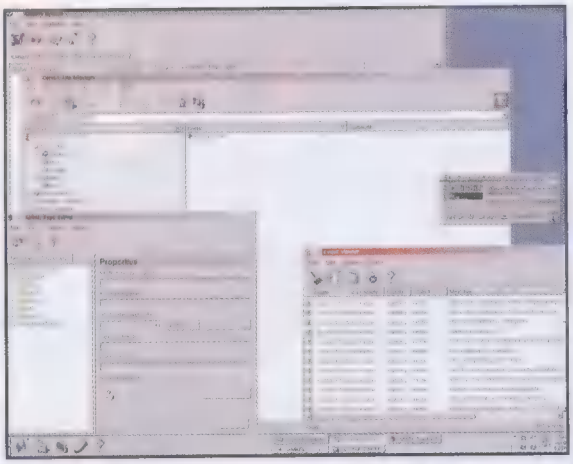
Hard disk partitioning is the step voted most likely to send new users scrambling for the Windows restore CD. Thankfully, Corel reduces this to a few mouse clicks with options to take over a disk, use free space, edit the partition table, or install in a DOS/Windows partition. The last option installs everything into a directory on your Windows hard drive. You boot the Linux system by dropping to DOS and running the startcdl.bat file. This loads the system using two huge files (root.img and swap.img) as virtual hard drives. This is a neat trick–it doesn't touch the partitions or boot records, but is noticeably slower when accessing the "drives." A third-party tool such as *Partition Magic* would have been a nice touch, but the Corel Install Express is surprisingly usable.

LILO, the LInux LOader, gets a graphical overhaul and has options for booting into Windows (if you're dual booting), normal *Corel Linux*, or various debugging modes. Linux (VGA mode) is especially helpful as it pops you into a 640x480, 256-color X session. Much like Windows, *Corel Linux* hijacks the master boot record and installs LILO there.

Corel automatically boots into X using the KDE desktop, but this isn't your grandfather's KDE. Corel waved the Redmond wand over some KDE favorites and made the slickest desktop we've seen even slicker. While not as in depth as such standard tools as Linuxconf or YAST, the control panel puts the most commonly

For definitions of Terminator words, hyperlink to the back of *Maximum Linux*, or check out the Terminator online at www.maximumlinux.com

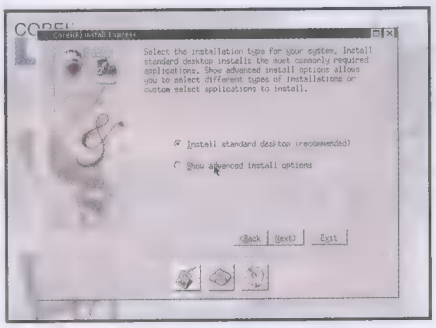
needed tools all in one place. New settings are spawned in a new window for testing, with the screen resolution, color-depth, and desktop settings integrated into a single panel. The network section also gets a boost with panels dedicated to Ethernet, Samba server, and Samba configuration.



Here's the Corel Linux desktop, in its full color splendor.

Corel File Manager is perhaps the most improved KDE app and integrates a two-paneled display with My Home, System, Windows Network, NFS Network, CD-ROM, and Floppy folders. With it you can browse local files, shared Windows and *nix NFS network drives, Web pages, and FTP sites. Not even Windows Explorer can pull off these tricks. Hold a file over a closed folder and it opens. CD-ROM and floppy drives are auto-mounted by clicking on the appropriate icon. Permissions and Windows (SMB) sharing can be accessed with a right-click. Even the order of the context menu is in homage to Windows. This Window-ization of Linux is designed to ease the learning curve, and is certain to irk veteran users, but most of it is pretty sweet stuff.

Other niceties include the MIME Type Editor that handles file associations and the icons that go with them and Event Viewer, which is similar to the Windows 2000 utility of the same name. This little guy lets you browse the system logs, a necessity as Corel throws the log files all over the /var directoy.



Corel Linux's "Install Express" is sweet. About the only thing you'll have to do is answer four simple questions and you'll be on your way.

Following in the steps of Windows Update, *Corel Linux* includes Corel Update, which serves as a front-end to the Debian package management tools. New users can avoid all those messy dependency issues and use a point-and-click method to add packages. While the default is to look to Corel's FTP site in the stable branch, additional Debian sites can be added including unstable and non-free branches. The main branch requires the software to be free of charge, freely redistributable, and come with full source code. Contrib. software is free but requires non-free software (software that is not redistributable or without source code) to run. Stable software is well tested, while unstable software is on the cutting, sometimes bleeding edge.

Corel Linux is offered in three flavors: A free download in .ISO format, the Standard version for $59.00, and the Deluxe for $89.00. The downloadable version is also available on CD for $4.95 plus shipping. The downloadable version is light for a distribution, weighing in at just over 311MB. It includes *Netscape Navigator 4.7*, the enhanced KDE 1.1.2, *GIMP*, and *Kmail* (no other e-mail client is included)–but not much else. The Standard version adds an excellent 350+ page user guide, 30 days of e-mail install support, *Netscape Communicator 4.7*, *Adobe Acrobat* reader, *WordPerfect 8* (the "light" edition), and 20 fonts. The Deluxe throws in telephone install support, 200 fonts, OSS sound drivers, the *WordPerfect* manual, *BRU backup*, *Civilization: Call to Power*, and a Tux mascot.

So why fork over the $59 to $89 for a retail version? One word: support. The user guide that ships with the retail versions is the best guide yet for the Linux beginner. Period. Corel takes the user through various install scenarios, covers the basics of the desktop, and gets the user to work. Server applications aren't covered in the guide as this puppy has "desktop" written all over it. The Standard edition offers 30 days of install e-mail support, with the Deluxe version adding 30 days of telephone support. E-mail questions were answered in one business day after registering on-line.

Is *Corel Linux* the Windows killer we've all been waiting for? Not quite, but it's the first Linux distribution to offer a viable alternative for the average Windows user. Linux has always had the servers. But we want the desktop, too.

–Evan Eveland

MAXIMUM LINUX VERDICT

Price Free download, Standard: $59, Deluxe: $89
Company Corel Corporation
Phone 800.772.6735
URL linux.corel.com

HELP DESK

If you've taken the *Corel Linux* plunge and find yourself in a quandry, Corel Corporation does offer free and fee-based technical support. As expected, e-mail support is cheaper than talking to a live person, but in any case, be prepared to shell out some more of your hard-earned cash. Pricing schemes vary, depending on the method of support chosen, but range in the vicinity of $30 - $150 (in US dollars).

For example, one incident with phone support will cost you $50; e-mail support only $30. You get a bulk-rate discount if you have more than one incident, and you'll pay even more if you're query relates to code or application development. Of course, if you're really stuck, you can always turn to the *Maximum Linux* forums at: www.maximumlinux.com and post your problems for free!

REQUIRED

Pentium or Pentium-compatible processor; 24MB RAM (64MB recommended); 500MB of hard disk space; CD-ROM drive; 2MB VGA PCI video card; mouse

HIGHS

- 4-step install process
- Innovative KDE enhancements
- Sweet Tux mascot
- Graphical LILO
- Tweaked File Manager
- Beefy user guide

LOWS

- Light package list
- Deluxe version kind of pricey
- No development tools

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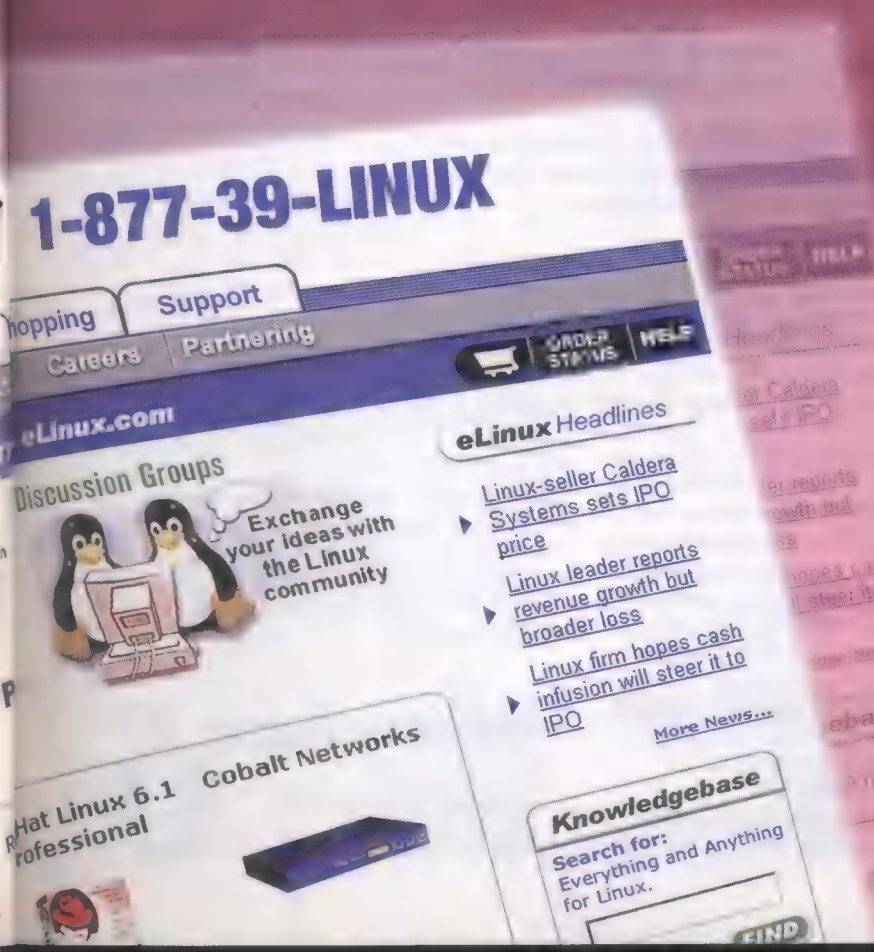
#56769	Stampix Storm Linux 2000	$29
#57536	SuSE Linux 6.3	$32
#57350	Corel WordPerfect Office 2000 Standard	$99
#58871	TurboLinux Server 4.0	$169
#814067	Slackware 7.0	$26
#61823	TerraSoft Yellow Dog Linux Champion Server 1.1	$87
#46267	Linux for Dummies	$22
#814094	Red Hat Linux Bible	$25
#813978	BRU Personal Edition 6.5	$74
#56804	RaQ 3i Internet Server 128MB, 13GB, Dual Ethernet	$2649
#37242	HP LaserJet 882C Printer	$399
#44001	Palm IIIX Organizer	$229
#44947	3DFX VOODOO 3 3000	$140
#49707	3Com 10/100 PCI Adapter	$65



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1-877-395-4589

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BSD TIPS AND TRICKS

Another difference you'll notice from other popular distributions is that your init scripts are BSD-style, instead of SystemV-style. You'll only have an /etc/rc.d directory, in which all your init scripts will be named sanely, so you'll know where everything resides. For example, the init script for loading modules will be rc.modules, and the script for configuring your network will be rc.inet1. Some programs will fuss about this during installation (including *VMware*)–they want a SystemV style of init scripts (like Red Hat's)– in which case it's recommended that you 'fool' it by creating another rc.d directory elsewhere in the filesystem and create a sys-v-like structure, then copy whatever init scripts it creates into /etc/rc.d, and modify one of your existing scripts to call upon it. This is a little more tedious for sure, but this is the price you pay for being granted access to the nuts and bolts of the system.

REQUIRED

Base install: 386 or higher CPU, 20MB or greater hard disk, 4MB or greater RAM
Full install: Pentium class CPU or greater, 2GB or greater hard disk, 16MB RAM or greater.

HIGHS

- Stable
- Very customizable
- Multiple pre-installed window managers
- Nice manual included
- Excellent for learning the innards of Linux

LOWS

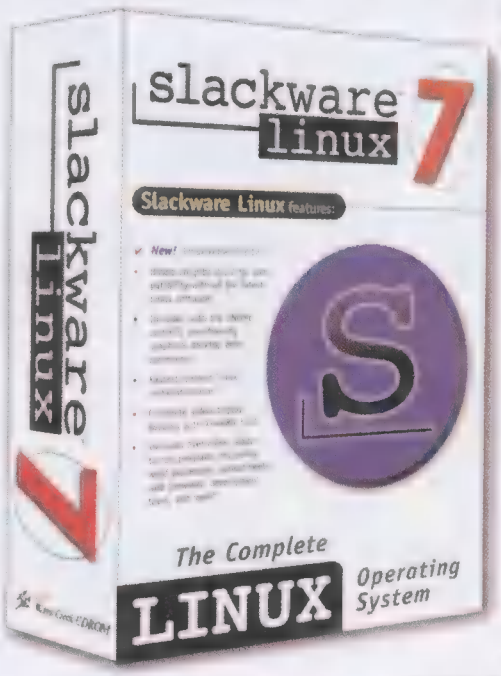
- Scary to new users
- No centralized support
- No safe partitioning tools

Slackware Linux 7.0

THIS AIN'T NO SLACKER DISTRO

If you want to get at the heart of the Linux operating system, do things your way, and learn how everything works from the start, then *Slackware 7.0*–which does its tasks well enough to please just about any power user out there–is the distribution you've been waiting for.

Since *Slackware 7.0* strives to be the most UNIX-like of all distributions, upon loading the CD (which is bootable), the first thing you'll notice is the lack of gussied-up graphical screens. Instead, you'll be greeted with cold, hard text–the bare bones of any real computer program. The screen will show a "boot: prompt", with additional text instructions telling you that the prompt is merely for entering extra parameters, most of which aren't really required, since the majority of your PC's hardware will be auto-detected by the kernel. (phew!) After you press **Enter**, you'll see the familiar kernel loading screens as the kernel boots up and gives you a "login: prompt", where you may login as root with no password to begin the installation. On the downside, the only tool *Slackware 7.0* provides for safely resizing an existing partition is *fips*, an application that's older than dirt and not always your safest bet.



If customization is what you're after, then Slackware 7.0 should be your distribution of choice.

Tip: If you do use *fips*, be sure to defrag your Windows drive beforehand.

Even though the installation script for *Slackware 7.0* is light years behind other new distributions, and partitioning still has to be done by hand with *fdisk* or *cfdisk* (a far cry from Red Hat's *disk druid* program), it still gets the job done just the same. After you've partitioned the drive, running **setup** will start the install, a step-by-step ncurses-based procedure, based on the ncurses-console graphics library. Everything within the setup program is menu-driven, but since there's no mouse interactivity, all selections must be done with the keyboard. As horrid as this may sound, the entire setup process is still relatively painless.

After the installation, the **reboot** command is issued to restart the system. Be sure to notice that everything looks nice and familiar during boot up, with the kernel autodetecting most of the hardware, as any freshly installed distribution should. Upon logging in however, you'll begin to realize how very few things are actually configured, which allows for much more control over how things are set up in the system. You won't find *xconfigurator* or *linuxconf* here. Instead, most of your Linux configurations will be completed with manual pages and very few scripts. X-Windows will be set up with the xf86Setup or xf86config scripts, and network configuration, if not done during setup, will be executed with the netconfig script.

Included in the packaged version of *Slackware 7.0* is a 300-page manual on installation and configuration. Although this massive tome may seem better suited for the restroom than for the bedroom (oh, c'mon…what do you do while sitting on the throne?), the manual is a welcome change for Slackware and should prove to be a valuable resource for users of every skill level. However, with no centralized technical support (still), you'll have to rely on *Maximum Linux*, newsgroups, local gurus, and Internet Relay Chats (IRC) for answers to any problems which aren't covered in the manual.

Without a spiffed-up installation routine, *Slackware 7.0* should definitely *not* be the distribution of choice for beginners, but it is nonetheless a wonderful system for those with experience in Linux and UNIX environments. The level of control *Slackware 7.0* provides leans heavily on learning how things really work in a UNIX-type environment, but you'll be a better power user or system administrator for using it.

–Rob Hall

MAXIMUM LINUX VERDICT

Price $49.95
Company Walnut Creek CDROM
Phone 800.768.9907
URL www.cdrom.com

Xybernaut Mobile Assistant IV Wearable Computer

A GEEK'S DELIGHT

Ultralight notebook computers are da' bomb if you want to go mobile with Linux. But what do you do when you want to access your Linux/UNIX applications when you can't plump your butt down in a comfy chair? What you need is a wearable computer. Like Xybernaut's MAIV.

Although the Xybernaut MAIV represents the state of the art in wearable computer technology, you sure as hell won't sport a stiffy after taking a look at the specs. Sure, the 233MHz Pentium MMX PC under the hood provides sufficient juice to run Linux and other embedded applications, but with only a 2.1GB hard drive and 64MB of RAM, the MAIV doesn't come anywhere close to the power of today's truly potent portables. But then again, it's not supposed to.

The head-mounted camera can capture and send video to a remote monitor, so others can see what you're seeing.

For starters, what notebook have you seen that forces you to wear a head-mounted display (HMD) similar to the ones used by U.S. Army Apache AH-64 attack helicopter pilots? We thought so. The HMD, dubbed XyberView, contains a miniature color liquid crystal VGA display, measuring 1.1 inches diagonally, which projects an image onto a small reflection mirror in front of your eye. In theory, this setup gives the appearance of having a 15-inch monitor hovering in space slightly to the left or right of your head. Spooky. If you're afraid of horrendous helmet head, the HMD can be switched out for a wrist-mounted LCD flat panel display instead.

When used in the field–the jungle, an inner city E.R., or the hot seat on Regis' television show–the MAIV's main CPU module and rechargeable battery pack are suspended from a belt worn on your torso or can be attached to a special vest. The CPU is connected to a miniature keyboard mounted on your wrist via a special cable. The mouse controls are manipulated using a directional pad and two buttons on the CPU module. Using the mouse is awkward at first, but after an hour or so of practice, it becomes second nature. When everything is fully assembled and running, the MAIV almost becomes part of your body, not unlike those Borg implants that the luscious Seven of Nine is accustomed to.

To install an OS on the unit, you can attach a special floppy disk drive to the main CPU, or use a PC Card-based SCSI adapter to connect a CD-ROM drive. Although the MAIV was originally designed to work with Windows 95 and NT, our evaluation unit came preloaded with Red Hat Linux 6.1. But–and this one is even bigger than Jennifer Lopez's much-maligned tush–the headset-mounted USB camera (yep, just like the reconnaissance cameras used by the Colonial Marines in *Aliens*) and embedded sound card do not work on Linux. Xybernaut expects to resolve this problem in future models of the MAIV by using generic Soundblaster hardware for the sound card and implementing Video for Linux USB drivers for the "Xybercam" in the upcoming 2.4 Linux kernel.

Aside from these hardware incompatibilities, everything else on the unit worked flawlessly. Using a PC Card wireless Ethernet adapter and Breezecom's 2.4GHz Ethernet card, we accessed the Internet via *Netscape* and connected to X Windows applications on Linux and UNIX servers on our LAN with ease. Even better, we were able to do all of this by walking around outside, completely untethered–causing more than a few pointed stares, incredulous looks, and guffaws.

There's no denying the MAIV is a cool product. And with recent advances in power consumption technology, heat management, and PC component miniaturization, we're pretty sure you'll be seeing plenty of PC-enhanced geeks staring into space hacking their shell scripts, participating on IRC, browsing the Web, and walking down Main Street in the not-too-distant future. But unless you have the money to burn, the MAIV should only be admired from afar.

–Jason Perlow

MAXIMUM LINUX VERDICT

Price $6,300 as configured
Company Xybernaut
Phone 888.992.3777
URL www.xybernaut.com

CAVEAT EMPTOR

Cool mobile computer technology also has distinct disadvantages. As configured, the MAIV is priced at just over $6,300, which, unless you're playing the ponies, can't be considered chump change. The 233MHz MMX processor is also underpowered for heavy multimedia applications (such as video conferencing), and with the MAIV's batteries providing only 4 to 6 hours of continuous use, you'll need to lug a spare battery pack or two just to make it through an entire day.

Also, the HMD is only capable of rendering a 640x480 desktop, which you'll find restrictive when running a GNOME/Enlightenment or KDE environment.

Using FVWM95 or other similar minimal window managers yielded far better results.

REQUIRED

Human body

HIGHS

Provides the ultimate mobile computing experience

Serious cool factor

LOWS

Assimilation comes with a hefty price

No Linux support for sound card and HMD

Underpowered CPU

640x480 display

PICK A CARD

In addition to the classic games of Freecell and Klondike, *Eric's Ultimate Solitaire* also includes 21 other solitaire variations that should provide endless hours of addictive gameplay:

- Alisa
- Baker's Dozen
- Black Hole
- Bristol
- Calculation
- Canfield
- Casino Klondike
- Eight Off
- Forty Thieves
- Golf
- Montana
- Poker Square
- Pyramid
- Spider
- Spiderette
- Three Shuffles
- Towers
- Westcliff
- Whitehead
- Yukon

REQUIRED

Pentium or PowerPC-based computer running Linux OS;16MB RAM; XFree86 3.3.x;OSS compatible sound card (for sound)

HIGHS

- 23 addicting game variations
- MIDI music and digitized sound
- Cheat, "Show Playable" and "always winnable" functions for lousy card players
- Minimal hardware requirements

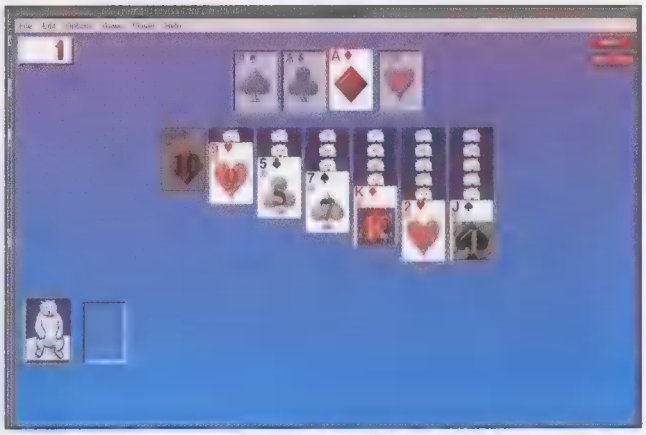
LOWS

You can kiss your productivity goodbye

Eric's Ultimate Solitaire

A WINNING HAND

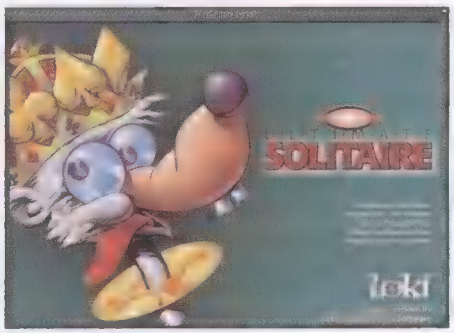
Anyone who's ever worked in a corporate office will tell you the thing they really do most of the time (when they're supposed to be toiling away for the Big Kahuna) is play Solitaire. Over the years, Solitaire has proven to be a serious bane to office managers–but unlike the multi-player mayhem machismo that accompanies such games as *Quake* and *Unreal Tournament*, Solitaire is more subversive activity, affording you a reduced risk of getting caught while playing on company time.



Ahh... aren't they cute? The only thing missing is a bottle of Coke.

As expected, and thanks in part to the increasing acceptance of the penguin as a desktop OS, it was only a matter of time before a similar destroyer of productivity landed on Linux. And after playing with *Eric's Ultimate Solitaire* for a few weeks, we issue this fair warning to all consumers and sysadmins alike: Stay away from this puppy at all cost if you expect to get any real work done. Even close family members–who were not accustomed to such frivolous activities–wasted more time than they dared to admit playing this game.

At its core, *Eric's Ultimate Solitaire* is a huge improvement over the built-in Windows game. There are 23, count 'em, 23 different variants of solitaire card games (including the venerable Klondike and Freecell that we all know so well), so even if you call yourself a Solitaire connoisseur, chances are you'll find a game that you've never tried before. If that weren't enough, *Eric's Ultimate Solitaire* also includes 39 different MIDI music themes that play in the background (you can even add your own MIDI files to the playlist). The only catch is that you must have a Linux-supported sound card in your PC and enable ESS audio support in your kernel (or loaded as a sound module). Other multimedia features include digitized sounds of cards being dealt and the catcalls of the game's Goofy-esque weasel mascot who tells you–in no uncertain terms–how much your card skills suck when your game takes a decidedly downward spin. Each game variation also has its own distinct card pattern–a nice touch.



Eric's Ultimate Solitaire is a blast. The credit goes to Loki for an awesome port.

If your card-playing skills leave much to be desired (like ours), there's also a cheat function you can take advantage of, but be forewarned that you'll pay the price in points. If needed, you can always set the game to be "always winnable" to give yourself even more of an extra edge. To help you learn each variant, a "show playable" feature can be toggled on, highlighting the cards that can be played–a nice feature for card game idiots like ourselves. Each game variant also has its own distinct help screen that summarizes the rules and goal objectives.

Like all of Loki's games, *Eric's Ultimate Solitaire* has a nice graphical installation program for shell-script-averse Linux beginners or those of you who just don't want to muck around with the command line. Fully installed, the game takes up just over 50MB. And whether you're running the game in GNOME or KDE, the interface is very reminiscent of the Windows version–which should come as no surprise since the Linux version of *Eric's Ultimate Solitaire* is practically an identical port.

Eric's Ultimate Solitaire is a keeper of a game, and given all the variations of Solitaire that you can play, it'll provide countless hours of addictive, and productivity destroying, gameplay.

Enjoy.

–Jason Perlow

MAXIMUM LINUX VERDICT

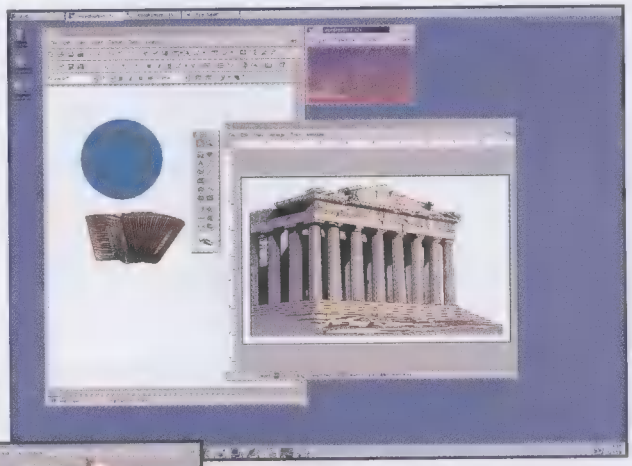
Price $30
Company Loki Entertainment
Phone 714.505.8915
URL www.lokigames.com

WordPerfect 8

NOT PERFECT, BUT CLOSE

The WordPerfect lineage is steeped in tradition and history, and Corel has done a great job of keeping the tradition alive with *WordPerfect 8*. Not only does this latest iteration do a great job of offering a tremendous amount of features to the Linux enthusiast–it's all packed into a relatively inexpensive retail package, too.

After using *WordPerfect 8's* nifty X-Windows-based install program, the first thing we loaded up was a *Microsoft Word* file document to see how much of the formatting would remain intact. *WordPerfect 8* includes 78 file format converters (we counted), including one for *Word97*, but doesn't yet include one for *Word2000*. We continued undaunted with our *Word2000*-formatted document, and much to our surprise found most of the formatting unscathed. Some of the tables and columns deviated from the original, but most could be massaged back into place with minimal effort.



Charts couldn't be simpler than this. Pick one of seven different formats and customize at will.

Our attempts at importing and exporting HTML pages were less successful. Importing an .html file was pretty straightforward, but the parser got confused by JavaScript code. The exporter was even less stellar. Even a simple table-style layout ended up being just, well, boring and not at all the way we expected it to look. For fun, we tried to load a simple *Excel* spreadsheet, only to discover the program disappeared–vanishing into the /dev/null netherworld with a Segmentation Fault. It's peculiar and disappointing that this format wasn't supported more thoroughly, especially considering *Word* and *Excel*'s overall popularity. To *WordPerfect 8's* credit, it does import comma- or tab-separated files, which are pretty much universally supported by any applicable program. The box packaging claims there are 130 unique fonts included, but our actual font dialogs fell short of that number. It's almost as if the varying point sizes, some of which were in foreign languages, were each counted as a unique font. Weird.

Much like Wizards in the Microsoft Windows world, there are 76 bundled "ExpressDocs" to generate common documents such as resumes and business letters. Corel has also given users the ability to edit a remote file on another server. We're not sure just how useful this feature actually is, but it's interesting nonetheless. Docs can be sent directly from inside the program via e-mail, but without your address book it definitely has limited use. On the flip side, a potentially very handy feature is "Quick Correct"–a way to swap a shortened version of a word, phrase, or hyperlink with the long-handed version. Other notables include support for macros and a "repeat next action x times" menu option for quickly reproducing redundant tasks.

A graph generator makes creating most any kind of chart as easy as filling in the data fields and selecting the style. And finally, an honorable mention must be given to the "Make it fit" feature, that literally adjusts margins and font sizes to make the given document fit a target number of pages. We wish we had this one when we were in high school and forced to write a ten-page paper on the merits of potatoes.

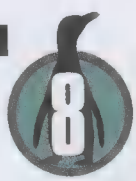
WordPerfect 8 has so many useful features that a single page review couldn't possibly do it justice. Perhaps that's why the program ships with a 20MB online manual and ■ 730- page printed novel, er, manual. Overall, we found *WordPerfect 8* to be a mecca for personal customization, and the program's GUI to be clean, well laid out, and extremely intuitive to use. Many features of *WordPerfect 8* weren't mentioned here because they're just such staples of any word processor and would be glaring holes if they were missing (but they're not).

In short, *WordPerfect 8* is a solid and robust product. The low price is just icing on the cake.

– Daevid Vincent

MAXIMUM LINUX VERDICT

Price $70
Company Corel, Inc.
Phone 888.733.4281
URL www.corel.com



LUCK OF THE DRAW

WordPerfect 8 comes with a drawing program that isn't as slick as *GIMP*, but it isn't too shabby either. It lacks plug-ins and all the snazzy features of ■ photo-editing product, however, it does have its own strengths.

For example, the fact that everything is treated ■ an object is very nice. Moving, stretching, and scaling are as simple ■ grabbing the handles and pulling. But with a library of more than 5,000 clipart images, 200 photos, and 187 textures included, you probably won't be using the program to draw something from scratch anyway.

REQUIRED

86DX33 or better. Pentium recommended. Kernel 2.0.x or better. X-Windows. 9MB RAM for first instance and 2.5MB for each additional instance. 50-115MB of HD space. CD-ROM to install.

HIGHS

- 5,000+ clipart images
- 200 photos and 187 textures
- 130 fonts
- 20MB Online User's Guide for X-Windows
- 1,000 printers supported
- 78 file format converters

LOWS

- Serial number copy protection
- No Excel spreadsheet importer
- Web/HTML converters are weak
- Outdated version of Netscape Navigator 3.02

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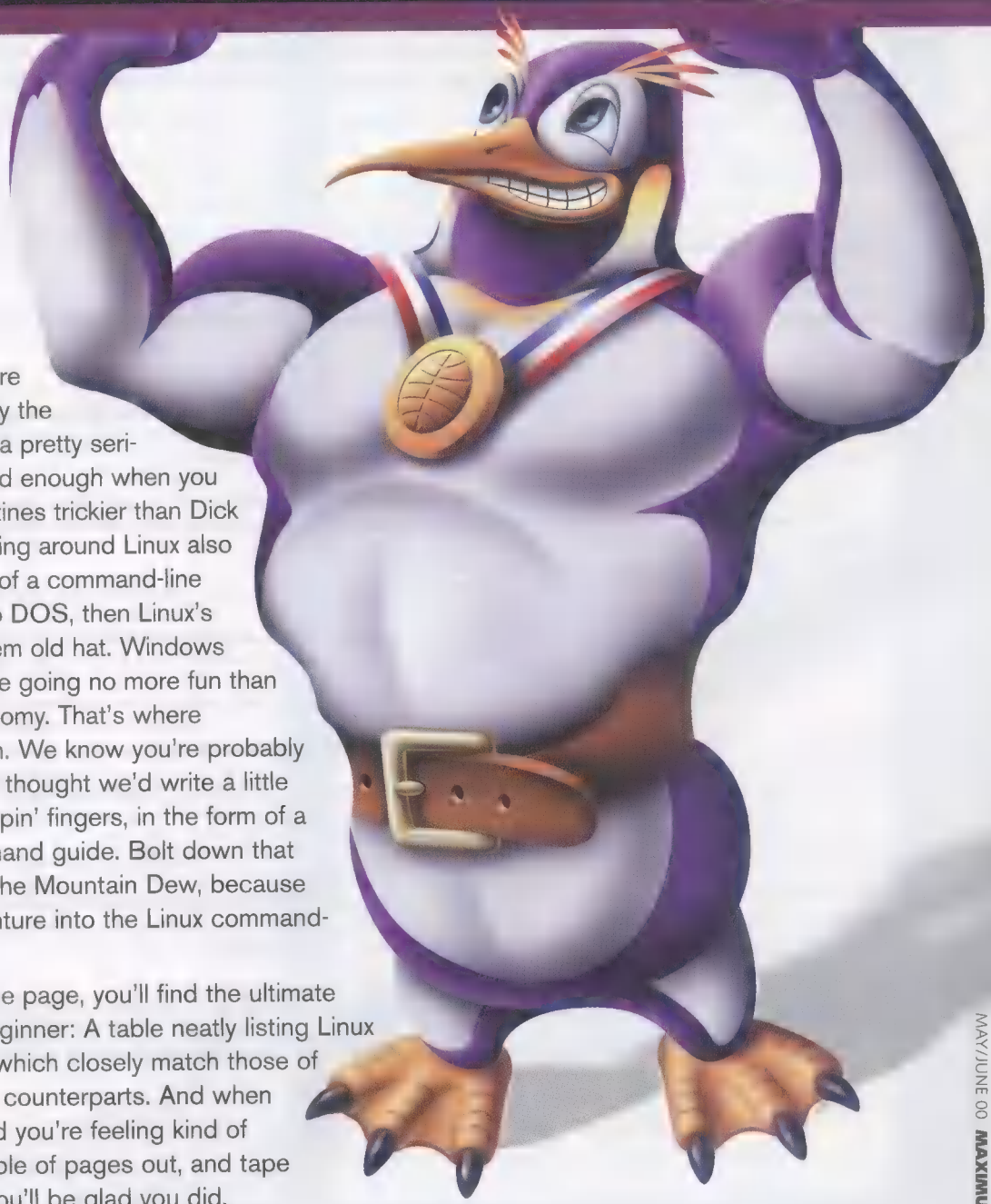
Taking Command of Your Linux Box

Understanding The Command-Line Interface



If you're new to Linux, then you'll know what we're talking about when we say the "little OS that could" has a pretty serious learning curve. It's bad enough when you encounter installation routines trickier than Dick Nixon himself, but navigating around Linux also involves the wacky world of a command-line interface. If you're used to DOS, then Linux's command-line fun will seem old hat. Windows fans however, may find the going no more fun than an emergency appendectomy. That's where *Maximum Linux* comes in. We know you're probably used to Windows, so we thought we'd write a little somethin' to whet your typin' fingers, in the form of a nice DOS to Linux command guide. Bolt down that keyboard and break out the Mountain Dew, because we're taking a little adventure into the Linux command-line world!

When you turn the page, you'll find the ultimate resource for the Linux beginner: A table neatly listing Linux command-line functions which closely match those of their Windows, er, DOS, counterparts. And when you start to get stuck and you're feeling kind of low, just rip the next couple of pages out, and tape them to your forehead. You'll be glad you did.

–Woody Hughes

Windows/DOS	Linux
ATTRIB–Changes file and/or directory attributes. **Usage:** attrib -h -s -r <filename> attrib +h +s +r <filename> *Blast From The Past: Can you remember what the above switches do?* +(-)h = on/off hidden +(-)s = on/off system +(-)r = on/off read-only	To change file or directory hidden attributes, simply rename the file with a period appended to the beginning of the file. There is no such thing as "system" attributes in Linux, relative to files and directories. To change the read attribute, you must use the chmod command. (see below)
CD–Changes directories. **Usage:** cd windows\system	**cd**–Changes directories. **Usage:** cd /root/mydirectory
CLS–Clears screen. **Usage:** cls	**clear**–Clears screen. **Usage:** clear
COPY–Copies one or more files to a destination you specify. **Usage:** copy c:\foo.txt c:\windows\foo.cfg	**cp**–Copies directories or files to a destination you specify. **Usage:** cp /root/foo.txt /foo.txt
DEFRAG–Optimizes disk performance by reorganizing the files on the disk. **Usage:** defrag c: ***Note:*** *In Windows you would simply select this command in the Systems Tools folder in your Start Menu.*	Linux, as a whole, does not have a defrag utility like its Windows counterpart. Linux does, however, have a few commands that will assist in debugging and/or repairing a system. **fsck**–Checks and repairs the operating system. Generally used when the system hasn't been properly unmounted during shutdown or reboot. **debugfs**–A system debugger. Generally used to examine and change the ext2 filesystem of Linux.
DEL–Deletes files you specify. **Usage:** del c:\windows\test.txt	**rm**–Deletes directories and files. **Usage: rm foo.txt**
DELTREE–Deletes a directory and its files and subdirectories. **Usage:** deltree c:\temp	**rm**–Deletes directories and files. Usage: rm -rf /root/test **Say What?** -rf = Forcibly deletes all subdirectories in a directory.
DIR–Displays the contents of a directory. **Usage:** dir	**ls**–Displays the contents of a directory. **Usage:** ls / ls -l /root **Say What?** -l = Displays everything in long format
DISKCOPY–Copies the entire contents of one floppy disk to another floppy disk. It writes over the existing contents of the destination disk as it copies the new information onto it. **Usage:** diskcopy a: a:	(See **cp**)
ECHO–Displays text as standard output. Also used to "paste" a string within a file while rewriting the file contents with that string. **Usage:** echo My cat is big echo Kitty > foo.txt	**echo**–Acts the same as Windows in that it displays text as standard output. **Usage:** echo pot pie > /usr/bin/pie Echo pot pie
EDIT–Executes the MS-DOS text editor. **Usage:** edit foo.txt	Linux has 2 common editors that most people use: *vi*, *pico*, and *joe*. They all have the same functionality as most other text editors, but vi is a little more advanced. *Vi* is also the oldest of the three. ***vi***–Unix text editor ***pico***–Linux text editor ***joe***–Linux text editor
EXIT–Exits an MS-DOS emulation window. Used in DOS 6.22 to "exit" the command interpreter and returns to the controlling program, if one actually existed. **Usage:** exit	**exit**–Used in Linux to exit a shell. **Usage:** exit
FIND–Searches for a specific string of variables in a file or files. **Usage:** find "gorilla" c:\windows\zoo.txt	Are 'ya looking for something special in that little document that Daisy wrote for ya? Check it out: **Usage:** find be_my_valentine.doc|grep Love ***Say What?*** *The "|" symbol tells the find command to pipe, or "send" all output to the grep command which in turn takes the output from find and looks for the word, "Love", the keyword we're looking for.*

REMEMBER: EVERYTHING YOU SEE HERE IS CASE SENSITIVE!

Windows/DOS	Linux
FORMAT–Formats a drive, erasing all data that resides on it. **Usage:** format a:	**mkfs**–Formats a partition and builds a filesystem. **Usage:** mkfs -t msdos -c -v /newdosdrive ***Say What?*** *The -t syntax specifies what the filesystem is to be. The -c syntax tells mkfs to check the drive for bad blocks. The -v syntax, produces, you guessed it, verbose output.*
HELP–Starts DOS help. You can also access help in Windows by going to your Start Menu and selecting "Help". **Usage:** help	**help**–Shows commands which are defined internally within Linux. **Usage:** help help alias
MEM–Displays the amount of used and free memory. **Usage:** mem	**top**–Displays process status. Also shows memory used and available. **Usage:** top
MKDIR–Creates a directory. **Usage:** mkdir c:\windows\mydirectory mkdir test	**mkdir**–Creates a directory. **Usage:** mkdir /new
MORE–Displays one page at a time. **Usage:** find "a" c:\windows\pstrip.txt | more	**more**–Displays one page at a time. **Usage:** more /var/log/secure
MOVE–Moves directories and/or files to a location you specify. Renames files and directories. **Usage:** move foo.txt c:\windows\system move c:\config.sys c:\config.bak	**mv**–Acts much like its Windows counterpart in that it moves or renames files and/or directories. **Usage:** mv foot.txt /root/foot.txt
MSD–Old DOS command that provided information about your computer. **Usage:** msd	Sorry folks, this one doesn't exist.
PRINT–Prints a text file. (Old) **Usage:** print foo.txt	Linux doesn't have a DOS-like print command. Whatcha' can do however, is use the "cat" command to "send" a file to a specified printer of your choice. **Usage:** cat myfile.txt > /dev/lp0
RMDIR–Removes directories. Also known as RD. **Usage:** rmdir c:\temp	(See **rm**)
RENAME–Renames a file or directory or files and directories. **Usage:** rename config.sys config.bak ren config.sys config.bak	(See **mv**)
SCANDISK–A disk analysis and repair tool. Checks drives for any errors and fixes them. Also accessed via the System Tools folder in your Start Menu in Windows. **Usage:** scandisk c:	(See **fsck**)
UNDELETE–Undeletes that which has been deleted. Essentially replaced by the Recycle Bin in Windows. **Usage:** undelete /?	There isn't one. Be careful out there.
VER–Displays the MSDOS or Windows version. **Usage:** ver	**uname**–Prints system information. **Usage:** uname
XCOPY–A utility to recursively copy directories and/or files. **Usage:** xcopy c:\windows d:\	(See **cp**)
PKZIP–This utility, now dubbed Windows Winzip, will compress files and/or directories into "zip" format.	**gzip**–Compresses and decompresses files and/or directories. **Usage:** gunzip file.gz

That wasn't so difficult, was it? Maybe one of these days Windows will match Linux in the functionality department...then again, maybe not. Regardless, now that you've mastered the command-line interface, your co-workers will regard you with awe, your boss will gleam with delight at your newfound abilities, and your parental units will be as proud as punch. Hell, maybe you'll get laid more, too. Or not. But hey, with the power of the penguin behind you, anything is possible.

SETTING UP APACHE

Some things in life are certain. Some things in life are not. The Internet with the World Wide Web is certain. An operating system without a fully functional web server is not. If you're running Linux you probably want to set up your very own Web site. But like most folks, you probably don't know where to begin. Lucky for you, our own Anders Brownworth—the man voted "Mr. Congeniality" by his high-school alma mater—is here.

Get ready for some web serving lovin' cuz this here is Ander's guide to the wonderful world of Apache.

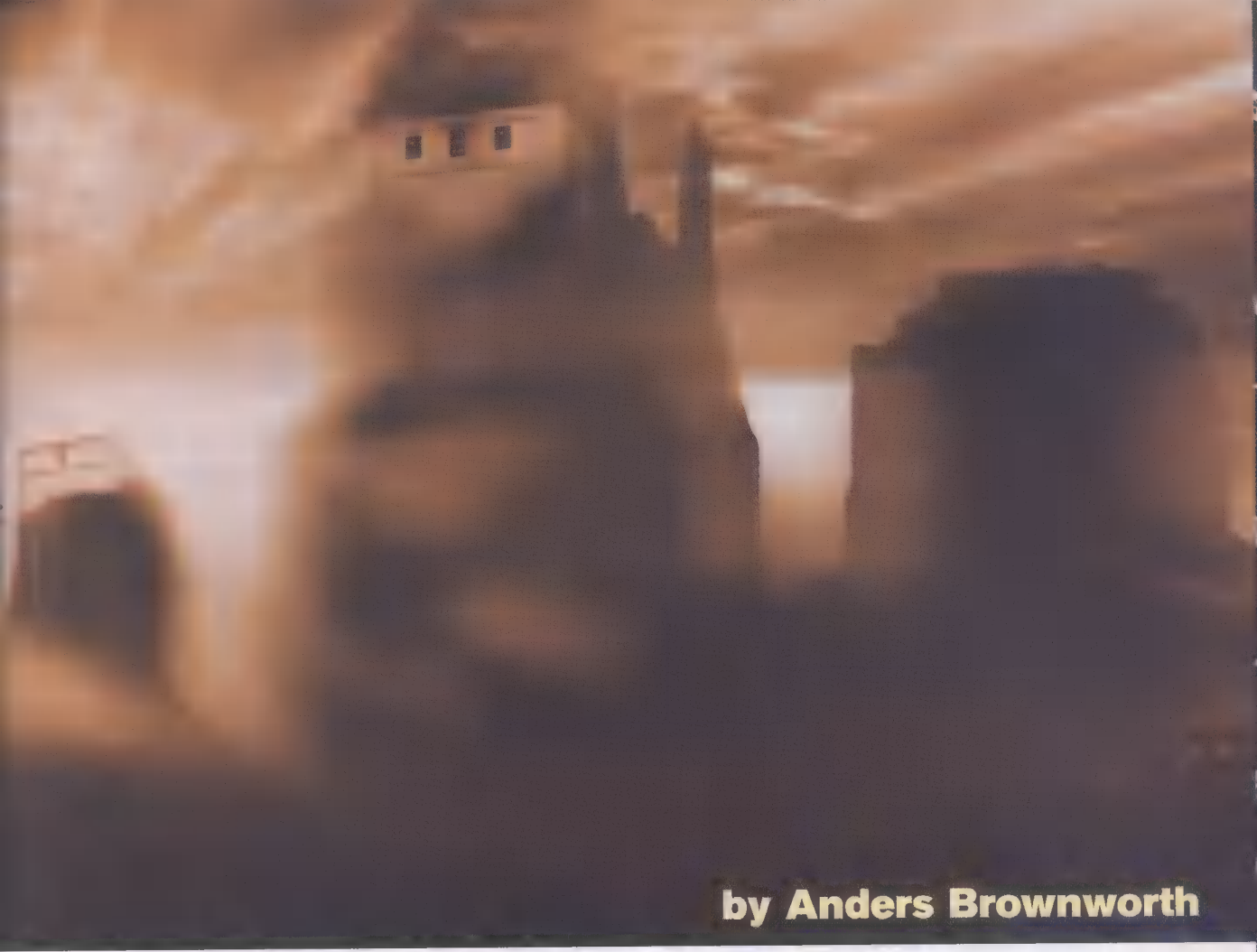
In the world of Web servers, there is Apache, and then there's everything else. Apache is easily the world's most popular browser, and for good reason. Like all good software, it's Open Source, and has benefited from thousands of eyeballs scrutinizing the source code for a really long time. It may not be the cleanest code in the world, but so many people have hammered on it that it is, nonetheless, really rock solid!

On the following pages, we'll take you through the process of compiling and installing the most recent version of Apache and provide all the specialized tricks and tips to do it right.

Boffo Bandwidth

All Web sites have to deal with bandwidth considerations. Traditional Internet connections provide phat pipelines for downloads, but slower pipes for uploads. If you're running a Web server, the overwhelming majority of content will be "uploaded" to your users, so you should think twice about starting a Web site using your DSL or cable modem broadband connection. Both of these technologies (with the exception of SDSL) have a high download bit rate but ■ slow upload bit rate. The same concept holds true for analog modems, and if you're really serious about setting up a cool Web server, a 56K modem shouldn't be your technology of choice in the first place. But we digress...

Virtually all Linux distributions come with some form of Apache. You probably already have some default Apache installation on your system right now. But do you have the latest version of the code? Do you know what options



by Anders Brownworth

were compiled in for you? Sit up straight, and hang on to your hats, 'cuz we're going to install Apache straight from the source!

The Basics: Getting A Server Set Up

As we went to press, the latest version of Apache was 1.3.11. To make things simple, we refer to this version number throughout the entire article.

The latest version of the source code is always available from the Apache Group by pointing your FTP client to ftp.apache.org/dist/ (it's always wise to use a local mirror). Download a copy of the source code (apache_1.3.11.tar.gz) and save it in a nice convenient location, such as /usr/local/src. It's probably a good idea to keep all copies of your installed software here so you can easily find them and check for version numbers whenever the need arises.

Now we need to uncompress and untar the package:

tar -xzvf apache_1.3.11.tar.gz

You could uncompress the file first with gzip -d apache-1.3.11.gz but the newer versions of tar include gzip compression and decompression on the fly with the "-z" flag.

Once you have the source ready to go, you need to compile the program. Go into the apache-1.3.11 source directory by typing **cd apache_1.3.11** and start the configuration script by typing **./configure**. This script will rip through your computer and determine a bunch of critical settings, including what compiler you're using and what libraries you already have installed. It'll probably complain about the lack of configuration options, but don't worry about that unless you want to install Apache in a non-standard location.

Now it's time to compile the package.

Everything installed in the /usr/local/apache directory—so type **make** in the source directory. This will compile everything in the source tree.

To install the package, you will need to run a **make install** as root. If you aren't already logged on your machine as root, you can use the command **su** to gain root privileges for this step. The distribution will end up in the default location (/usr/local/apache) unless you have selected something else in the configuration.

Okay, now we get to the juicy stuff.

Three files just got installed that you should get intimate with. The actual Web server is called "httpd", but the most important command you will use is **apachectl**, or Apache control. This little program takes arguments such as "start" and "stop" and essentially controls the server. httpd needs at least one configuration file, called httpd.conf, that you will find in the /usr/local/apache/conf/httpd.conf directory.

Let's go over the major config options in httpd.conf.

We'll skip most of the more obscure and set only the critical ones. Most important items are at the top of the file.

In your installation directory—/usr/local/apache/—you should have a configuration directory called "conf". Everything used to configure the Web server is in this directory. As we said, the main configuration file for Apache is httpd.conf. Open this file in an editor (you will need to be logged in as root to pull this off).

Leave most of the options at their default settings. If you perform a standard installation, located in the /usr/local/apache directory, you really won't have to change much to get your server up and running.

ServerRoot
/usr/local/apache
If you didn't install everything in the default location, tell Apache where things are using the ServerRoot option. This is where all the standard Apache directories live.

User nobody
Group nogroup
In case you leave a door open somewhere, or someone figures out how to trick the Web server into doing something malicious, the server is run as a user who has very few permissions. This way, if someone were to break in and attempt to rewrite your password file, the server would deem them unprivileged and, since the user "nobody" doesn't have permission to overwrite the password file, the attack would fail. Most major Linux distributions have a user called "nobody" and a group called "nogroup," but you might want to make sure these users exist on your system.

DocumentRoot "/usr/local/apache/htdocs"
The document root is the location of all your html documents. The default location has a sample Web page and all the server documentation, so this will probably do 'ya for the time being.

ServerAdmin webmaster@maximumlinux.com
The e-mail address you use in the ServerAdmin section is given as contact information in the event CGI doesn't respond correctly. This is usually set to a general delivery mailbox, such as webmaster@yourdomain.com.

ServerName www.maximumlinux.com
You can't just invent names! It's a good idea for the server to know its name in the event that it has to doctor up URLs. In other words, just typing "www.maximumlinux.com" as the ServerName does not make you maximumlinux.com! Set this to a domain name that will resolve to your server. If you would like your own special name, you will need to purchase a domain name (for about $35 a year) and establish yourself on the Internet. There are a bunch of companies out there that will do this for you, including Network Solutions. If not, you should use your server's IP address during this step.

Now it's time for the moment of truth.
Crank up the Web server with the command:

```
/usr/local/apache/bin/apachectl start
```

If all goes well, the server should now be started. You can check to see if it is running by running:

```
ps -axf |grep httpd
```

You should see an httpd daemon launched with 5 child servers hanging off it:

```
6106 ?   S   0:00 /usr/local/apache/bin/httpd
6107 ?   S   0:00  \_ /usr/local/apache/bin/httpd
6108 ?   S   0:00  \_ /usr/local/apache/bin/httpd
6109 ?   S   0:00  \_ /usr/local/apache/bin/httpd
6110 ?   S   0:00  \_ /usr/local/apache/bin/httpd
6111 ?   S   0:00  \_ /usr/local/apache/bin/httpd
```

The main process doesn't actually deal with Web connections–it just makes sure that the proper amount of child servers are hanging around. Spawning new processes takes time, and having the child servers deal with this makes more sense than encumbering the main process. For the quickest server response time, Apache leaves a bunch of spare servers hanging around to deal with requests as they come in. The root process will spawn new servers automatically to keep ahead of the load. You can change the minimum and maximum spare servers in the httpd.conf file, but for most users, the default is fine.

Now, fire up a Web browser and try hitting your server. Ideally, you want to test access from a computer other than your server. If everything went well, you should get the default Web page saying "It worked!" and an online copy of the Apache documentation.

Fooling With The Options

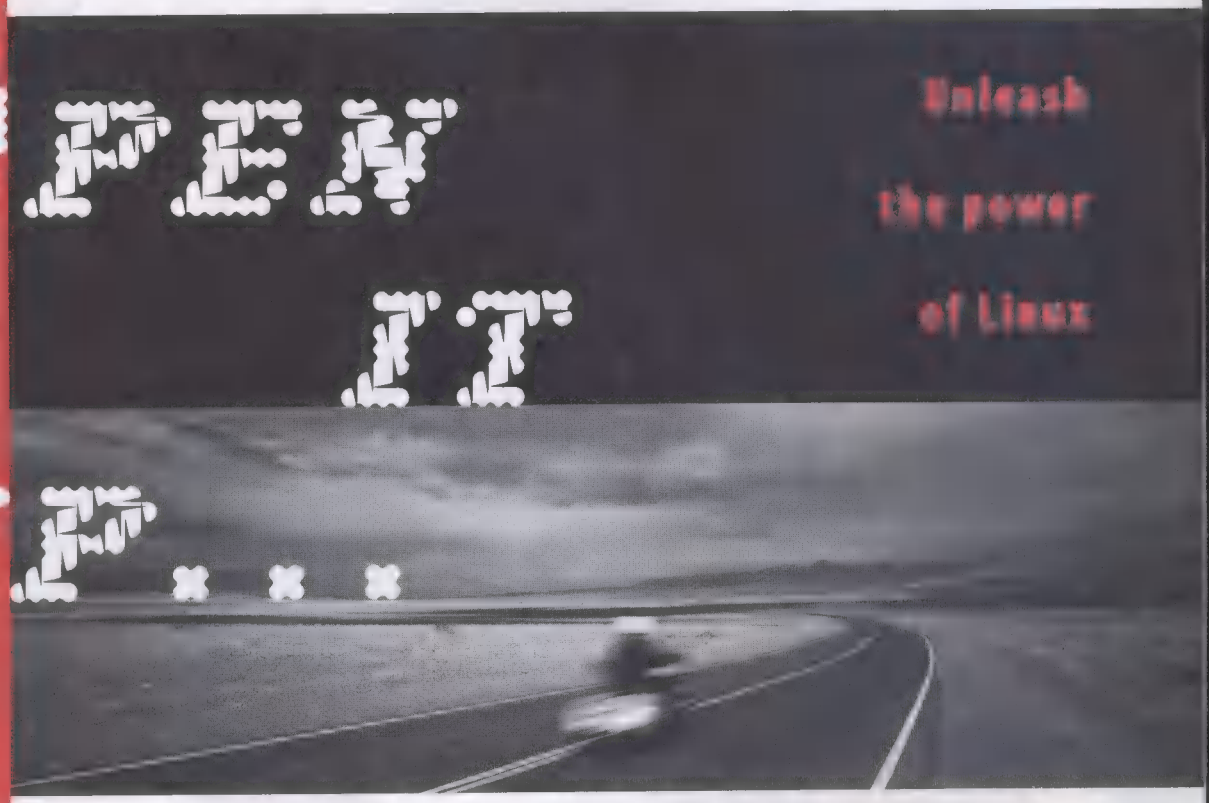
There are about 100,000 different things you can do with Apache. Let's touch on some of the more important ones. The httpd.conf file has many configurable options, but be sure you know what you are setting when you are playing with this file because it's easy to make your system vulnerable to attacks if you mess up.

UserDir
Once you have a Web server going, it's nice to give your users a way to publish on the Web without having to bother you for write access to the main document root. You've probably seen Web addresses with a tilde character (~) in them. By default, when Apache looks for http://www.maximumlinux.com/~anders/, it goes to the home directory for the user "anders" and looks for a directory called "public_html". Changing this to "www" is cool 'cuz it's easier to type, but set it however you wish.

DirectoryIndex
When a user types in www.maximumlinux.com, the Webserver must know what html page to send out. Traditionally, the default page is called "index.html," but varying flavors such as "index.htm" and "default.htm" have been pushed on us by an, ahem, unnamed monopolistic company. If your users are using FrontPage or other WYSIWYG HTML editors, you may want to include other default documents in the DirectoryIndex directive. Just separate them with a space.

```
DirectoryIndex index.html index.htm default.htm
```

AccessFileName
You know when you get that username/password box on some Web sites? Access restriction can be set up on a per file or per directory basis with an access file. By default,



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this file is called ".**htaccess**" and can contain many of the same parameters found in **httpd.conf.**

As an example, we can block access to a directory by using the "AllowOverride All" directive and placing a .**htaccess** file in the directory that you want to block. Make your .**htaccess** file look like this:

```
AuthName "Access"
AuthType Basic
AuthUserFile /usr/local/apache/conf/htpassword
AuthGroupFile /usr/local/apache/conf/htgroup
<limit GET>
require group users
</limit>
```

The first part of this file tells what type of authentication to use, and where the password and group files are. The second part limits access to the directory to people who have provided a good password and are in the group "users."

Let's say that the username we want to use is "john" and the password we want is "bozo". The /usr/local/apache/conf/htgroup file listed below shows us that both "fred" and "john" are in the group "users".

```
users: fred john
```

The last thing we need to do is create an htpassword file with john's username and encrypted password in it. Fortunately, there is a little utility distributed with Apache that creates and manipulates the htpassword file for us. Note: type the following in one line:

```
/usr/local/apache/bin/htpasswd -c
/usr/local/apache/conf/htpassword john
```

The command htpasswd -c creates a password file with "john" as the username and prompts for the password. If you want to change john's password, or add any new users, be sure to leave out the "-c" flag or you will overwrite your password file! When you have typed and confirmed the password, you should be left with a file that looks something like this:

```
john:3LttqYHM.WA96
```

Now you should have some simple authentication working.

Give it a try and see if you can login with the new Web account. Remember, in this case, Web users are not system users. In other words, they are not in the system password file (/etc/passwd) and cannot open a shell on your machine.

ScriptAlias

There are two ways to get CGI programs running–the old way and the new way! Initially, you would just designate a directory (/cgi-bin) as your CGI directory and everything in there would be treated as a CGI program. More recently, CGI scripts have been specified by extension. For instance, you might specify every file ending in ".cgi" to be a CGI program. ScriptAlias will let you set up a CGI directory. For example, we could do this:

```
ScriptAlias /cgi-bin/ /usr/local/apache/htdocs/cgi-bin/
```

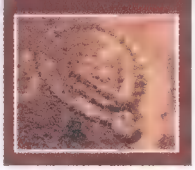
If we had a Perl program called date.pl that printed today's date, we could place it in this directory and access it in a Web page with /cgi-bin/date.pl.

Alternatively, we could rename it date.cgi and place it anywhere, if we add "ExecCGI" to the Options line in the directory root configuration section and add the cgi-script handler to associate .cgi files as scripts.

```
<Directory "/usr/local/apache/htdocs">
Options Indexes FollowSymLinks ExecCGI
AllowOverride None
Order allow,deny
Allow from all
</Directory>

AddHandler cgi-script .cgi
```

Tip: If you want, you can set index.cgi as a DirectoryIndex so you can use a CGI script for the default pages of your Web site!



When writing CGI scripts, don't forget to build up a proper html header. The following is the source code to the date.cgi script.

```
#!/usr/bin/perl

print "content-type: text/html\n\n";
print scalar localtime;
print "\n";
```

Don't forget to make date.cgi executable.

Redirect

Things change. People change. And sometimes those relationships that you thought would last forever end up sucking the life blood out of you, oops…never mind. But, there will come a time when you want to redirect requests to another place on the Information Superhighway. It would be easy enough to write a Web page that says "this page moved" or even one that automatically redirects browsers to another location, but in many situations, you just want every request to a specific directory to be universally redirected to another place. This is done with the Redirect directive.

In this example, every URL beginning with "/this_directory/" is redirected to http://www.maximumlinux.com/.

```
Redirect /this_directory http://www.maximumlinux.com/
```

VirtualServer / NameVirtualHost

You can run more than one Web site from the same machine. Essentially there are two ways to do this: You can set up aliased IP addresses on your server and attach a Web server to each address; or, you can use just one IP address and depend on the Web browser to tell the server what Web site it wants. In either case, proper DNS setup is critical.

If you want to use aliased IP addresses, you would set up an aliased IP address for each server you want and declare a virtual host for each in the httpd.conf file. In the example below, there are two virtual servers–www1.maximumlinux.com and www2.maximumlinux.com.

How do Web connections work?

When a Web browser wants to get a particular Web page, let's say http://www.maximumlinux.com/, it first looks up the IP address of the Web server. In this case, the IP address is 209.246.21.26. Next, it opens up a connection to port 80 (the default Web port) on that IP address. Next, it's the browser's turn to ask for a specific document, so it says "GET / HTTP/1.0" followed by two carriage returns. Essentially, the Web browser isn't specifying a particular html page here; it's just asking for "/". But the Web server knows to serve the file "index.html" as the default document, (set in the httpd.conf), so it spits this file out and closes the connection. The Web browser renders the page opening new connections for the images it needs.

You can see just how this whole process works by running telnet on port 80. Watch....

```
elmer:~> telnet www.maximumlinux.com 80
Trying 209.246.21.26...
Connected to www.maximumlinux.com.
Escape character is '^]'.
GET / HTTP/1.0      <- you type this followed by 2 returns
                       and you should get all the html kicked
                       back at you!
HTTP/1.1 200 OK
Date: Fri, 11 Feb 2000 02:45:22 GMT
Server: Apache/1.3.9 (Unix) Red Hat/1.1
Connection: close
Content-Type: text/html
        <html>
... (pages and pages of HTML!) ...
        </html>
Connection closed by foreign host.
elmer:~>
```

```
<VirtualHost www1.maximumlinux.com>
ServerAdmin Webmaster@maximumlinux.com
DocumentRoot /sites/www1.maximumlinux.com/Web
ErrorLog /sites/www1.maximumlinux.com/logs/error_log
TransferLog /sites/www1.maximumlinux.com/logs/access_log
DirectoryIndex index.html index.shtml index.cgi
</VirtualHost>

<VirtualHost www2.maximumlinux.com>
ServerAdmin Webmaster@maximumlinux.com
DocumentRoot /sites/www2.maximumlinux.com/Web
ErrorLog /sites/www2.maximumlinux.com/logs/error_log
TransferLog /sites/www2.maximumlinux.com/logs/access_log
DirectoryIndex index.html index.shtml index.cgi
</VirtualHost>
```

If you wanted to attach both of these servers to the same IP address and depend on the Web browser to let the server know what site it's looking for, you would use the NameVirtualHost directive and add a ServerName directive to each virtual host. In this case, both www1.maximumlinux.com and www2.maximumlinux.com relate to the IP address 206.57.18.204.

```
NameVirtualHost 206.57.18.204

<VirtualHost www1.maximumlinux.com>
ServerName www1.maximumlinux.com
ServerAdmin Webmaster@maximumlinux.com
DocumentRoot /sites/www1.maximumlinux.com/Web
ErrorLog /sites/www1.maximumlinux.com/logs/error_log
TransferLog /sites/www1.maximumlinux.com/logs/access_log
DirectoryIndex index.html index.shtml index.cgi
</VirtualHost>
<VirtualHost www2.maximumlinux.com>
ServerName www2.maximumlinux.com
ServerAdmin Webmaster@maximumlinux.com
DocumentRoot /sites/www2.maximumlinux.com/Web
ErrorLog /sites/www2.maximumlinux.com/logs/error_log
TransferLog /sites/www2.maximumlinux.com/logs/access_log
DirectoryIndex index.html index.shtml index.cgi
</VirtualHost>
```

Using NameVirtualHost you can add a virtually unlimited number of Web sites to the same IP address. The only possible downside to the NameVirtualHost approach is that very old Web browsers don't send the name of the Web site they are looking for to the server in the headers, so in these cases, those browsers would see the default, or first Web site, only. Generally though, this is a small price to pay for the flexibility of a NameVirtualHost server.

Logs—the good kind

One of the biggest tricks a Webmaster can pull is getting meaningful information from the log files that Apache constantly spews. Log files can be rotated (stop Apache from writing to one access log file and start a new file) on some sort of basis. For the majority of Web servers, rotation on a daily basis is probably going to be perfect, but you can't just move the log file to another filename and hope the server makes a new file and starts sticking logs in the right place. You would need to kill and restart the server for that to work.

But you, my friend, are in luck. Since this is quite a

universal problem, there is a log rotation script that ships with Apache. In the Apache binary directory (/usr/local/apache/bin/) you will find a program called "rotatelogs." This program is usually run by the server and configured in the httpd.conf file with the TransferLog directive. Adding the following to your httpd.conf file will cause logs to rotate once per day.

TransferLog "|/usr/local/apache/bin/rotatelogs /backup/archive [illegible]"

For you math geniuses out there, a single day has 86,400 seconds. Trust us, we did the math. With bc to boot.

With the above configuration, a log file called archive.nnnn where nnnn is the system time of the log start time. At this point you would probably schedule a cron job to gzip the log.

Now that we have the logs rotated on a daily basis, what do we do with them? You'll probably want a look at them to see what's been happening with your Web site. The easiest thing would be to just open the file up and look at it. However, a much more practical option would be to run the logfiles through some sort of log analysis software, which is infinitely cooler.

There are many free packages out there. We have had good luck with Analog and Wusage, but there are many others to choose from. Logging tools usually come with sample reports, so check them out to see what they offer.

Tip: Take a look at Yahoo's log analysis tools section located at: http://dir.yahoo.com/Computers_and_Internet/Software/Internet/World_Wide_Web/Servers/Log_Analysis_Tools/

Getting Fancy with Dynamic Pages

Dynamic pages are generated on the fly from a script or program. There are bunches of ways to make a site dynamic. One of the most popular CGI scripting languages is Perl. With its origins in UNIX, Perl is uniquely suited to the needs of CGI because of its flexibility, but its principal drawback is speed. It takes a relatively long time to launch and execute a Perl script against say, the speed of a compiled C program. But most people don't require absolute blinding speed, and Perl's flexibility usually outweighs this limitation.

The vast majority of Web sites out there are static, or built with flat html files. The only parts that can be thought of as dynamic are things such as feedback forms that run a simple CGI to collect results and possibly e-mails them to another address. These forms are simple enough, but once again, Perl can be used for a whole host of other functions. For instance, you can have a Perl script rip through a local text file and build some html on the fly. This would be handy if the text file were the latest product list showing what was in stock and how much each of the products costs. Building a simple shopping cart system based around this idea would be one way to make a dynamic Web site. Users could have orders calculated on the fly, and if you really wanted to get fancy, you could have the Perl script subtract items from inventory when they were ordered! Make sure you pick up the next few issues of *Maximum Linux*, as we'll be covering this in more detail.

You've probably heard about browser cookies—and we're not talking about the kind made by the Keebler elves either. When building a dynamic site, cookies, essentially an arbitrary serial number set by the server, are very useful. Web sites don't remember what pages they have sent to a particular Web browser, and in some cases they can't. So how can a Web site follow a user from page to page? Well, if a Web browser were to request a page from a Web site that uses cookies, the Web server would pick a random number and request that the Web browser send that random number back to the server every time it asks for a page. It's up to the Web browser to perform this task, but if it does, the Web site will be able to determine from request to request which browser it should be building personalized pages for. The invasion of privacy issues come into play when groups of Web sites get together and trade information behind the scenes and use information you typed into one Web site to profile you on another. Political differences aside, profiling is handy because it's nice to have the Web site learn what you like by watching what you click and then serve you ads that you might be interested in.

That's It, Baby!

You now have everything you need to get your Web server running. When newer versions of Apache come out, you will be able to just install them and go! Don't forget to go through all the online documentation, because there are hundreds of settings that you can tweak in your installation. Of course, the latest documentation and code will always be at http://www.apache.org/, so check there often. Also, a good book to use for further reading and reference is *Apache Server: Administrator's Handbook* by Mohammed J. Kabir.

As you can see, it's not hard to go crazy with a dynamic Web site. In upcoming issues of *Maximum Linux* we're going to cover more ways that you can make your Web site dynamic, particularly by using the popular scripting language Perl. We'll give you all the Perl source code and go through the steps necessary to build a fully dynamic e-commerce Web site. Stay tuned!

Mobile Mission Impossible

One man's quest to find a Linux-friendly handheld device

Finding a PDA that works well with Linux can be a tough assignment, should you choose to accept it. But Scott Locklin, an atomic physicist from Berkeley, CA, accepted our challenge with gusto. After all, Scott figured that his 20-odd years of experience using handheld PCs and his time spent finding new uses for rocket fuel qualified him for the mission. At the very least, Scott reckoned, he'd do a little bit of research, get paid for his article, pick up a new PDA, and be on his way to mobile Linux bliss in a mere couple of days. Was Scott successful? Did he join the Palm revolution? Or did he succumb to the Evil Empire's CE attack?

Turn the page for the first part of our two-part story.

By Scott Locklin

Illustration by Scott Park

Pocket Monkey

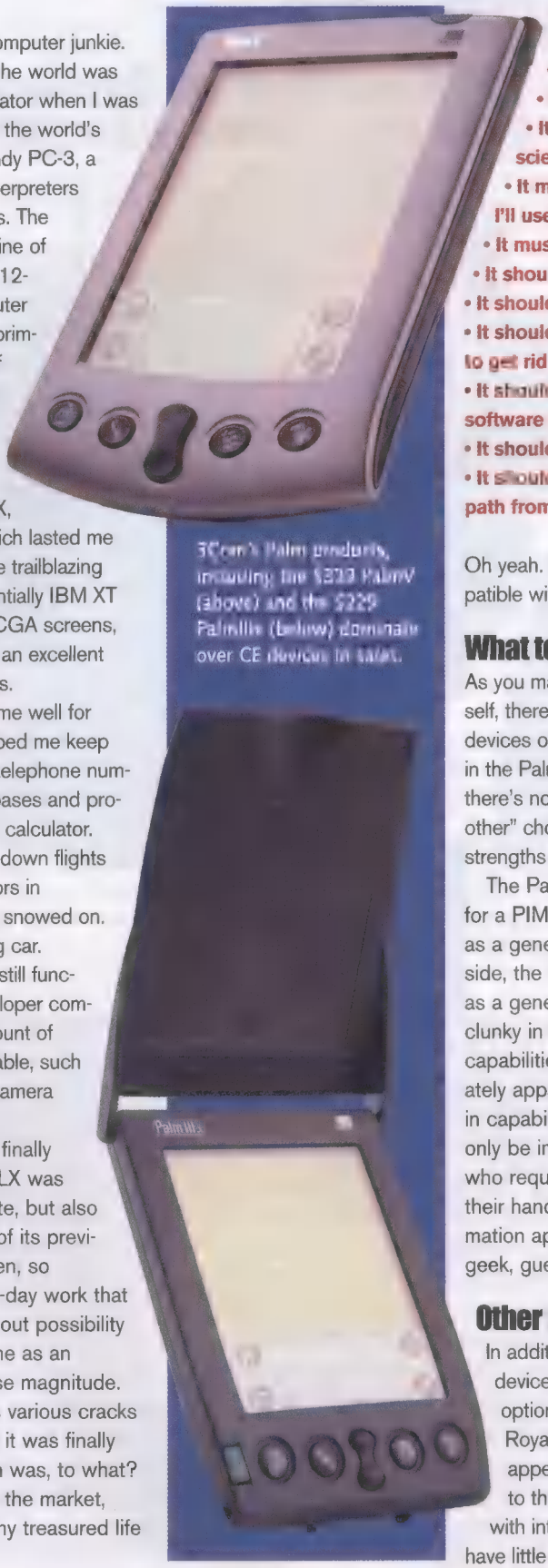
I've always been a pocket computer junkie. I started as early as anyone in the world was able. Instead of buying a calculator when I was a wee monkey, I bought one of the world's first pocket computers—the Tandy PC-3, a simple calculator with Basic interpreters and a few built-in PIM functions. The screen interface had only one line of LCD characters, but even to a 12-year-old boy this pocket computer was incredibly useful. It had a primitive notepad. It was capable of simple alarms. And, it proved a useful tool to use during school exams.

Later in life, I graduated to a used Hewlett Packard P95LX, and later still an HP100LX, which lasted me more than half a decade. These trailblazing palmtop computers were essentially IBM XT computers with monochrome CGA screens, DOS 5.0, a task switcher, and an excellent suite of built-in PIM applications.

My trusty HP100LX served me well for years. The built-in software helped me keep track of my appointments and telephone numbers, allowed for custom databases and provided a magnificently designed calculator.

My HP100LX was dropped down flights of stairs and onto concrete floors in machine shops, rained on, and snowed on. It fell off the hood of my moving car. Despite all this, it miraculously still functions. Thanks to an active developer community, there's even a vast amount of useful DOS software still available, such as Web browsers and digital camera interfaces.

Unfortunately, the dark day finally came when my trusty HP100LX was not only outdated and obsolete, but also no longer being made in any of its previous incarnations. I was, by then, so dependent on it for my day-to-day work that the mere idea of a failure without possibility of quick replacement struck me as an impending disaster of immense magnitude. This, combined with the unit's various cracks and dings, convinced me that it was finally time to upgrade. The question was, to what? With a plethora of devices on the market, what could possibly replace my treasured life partner? I only knew that:



3Com's Palm products, including the $333 Palm V (above) and the $229 Palm IIIx (below) dominate over CE devices in sales.

- **It must be small; preferably smaller than the HP100LX.**
- **It must be fairly rugged.**
- **It must have a PIM.**
- **It must do BIG MATH (because I'm a scientist, baby).**
- **It must connect with Linux (the only OS I'll use).**
- **It must not be vaporware.**
- **It should have multimedia.**
- **It should be cheap.**
- **It should do neat things with sound (I'd like to get rid of my MD recorder).**
- **It should have nifty, useful, and compatible software available.**
- **It should have long battery life.**
- **It should have a straightforward upgrade path from my HP100LX.**

Oh yeah. It would also be nice if it were compatible with something else.

What to Choose

As you may already have discovered for yourself, there are legions of pocket computing devices out there. The main two choices reside in the PalmOS and Windows CE families, but, there's no clear-cut "one is better than the other" choice. Clearly, both platforms have their strengths and weaknesses.

The Palm platform functions much better for a PIM device and is not particularly useful as a general-purpose computer. On the flip side, the Windows CE platform is fairly useful as a general computer but awkward and clunky in its PIM roles. The difference in PIM capabilities and user interface will be immediately apparent to the end user; the difference in capabilities as computational devices will only be important to power users—people who require multimedia, or who actually use their handheld computers as more than "information appliances." Being an irredeemable geek, guess which camp I fall in?

Other Options

In addition to Palm and Windows CE-based devices, there are plenty of distracting options out there: the VTech Helio and the Royal DaVinci are two examples of what appear to be decent hardware—equivalent to the PalmOS platform, and equipped with interesting, built-in software. But they have little in the way of applications, and don't

come with enough built-in stuff to make them entirely useful. And, as near as we can tell, they also don't sync with Linux in any simple way. Besides, you might have problems finding Royal's DaVinci—the company was served with a preliminary injunction when 3Com sued for patent infringement last year and was prohibited from selling the device (the case is still pending).

I also considered putting Linux on one of the Japanese-inspired "palm-sized" PC's, such as Toshiba's Libretto or IBM's PC110. This seemed the ideal solution—Linux in the palm of my hand! Then I thought about ▪ battery life measured in minutes. Ugh.

The Psion is also an interesting platform. It has an advanced operating system, EPOC32, which many embedded systems manufacturers are developing an interest in. It has a well-developed set of Linux tools for connectivity. It also has excellent Java support, for those of you who believe that sort of thing is useful. On the other hand, there is an apparent lack of software support for the platform here in the U.S. (it's more widely supported in Europe). Unfortunately, the physical hardware is slightly larger than the HP100LX, and less sturdy (all the ones we tried to test out at retail stores were physically broken).

It looked like I was back to my two original choices.

After 3Com was granted a preliminary injunction Royal made a few changes to its DaVinci handheld product. Although 3Com's lawsuit is still making its way through the court system, Royal is still selling the $99 device through major retailers and online.

Looking Under The Hood: Hardware

CPU

The guts of the Palm systems are Motorola 68380 "DragonBall" processors, a modern embedded variant of the venerable Motorola 68xxx series that powered the first generation Macintosh and Amiga machines. This chip is no powerhouse, but it is quite energy efficient.

The WinCE machines use Hitachi, strongARM, and MIPS RISC chips which are, believe it or not, more or less equivalent to the last generation of workstations (Sparc-20 class) in their best Dhrystone MIPS results. Pretty impressive. Pretty damning of Microsoft's incompetence is that they have written an OS that is substantially less snappy than PalmOS, despite running on machines which are factors of 100 faster in computational ability. On the other hand, this fundamental difference can be pretty important if you need handheld power. But the extra computational power generally comes at a cost in battery life.

Keyboard or Pen

One important choice is whether or not you want a mini-keyboard. Windows CE originally came only in the mini-keyboard configuration, whereas PalmOS machines come equipped with a stylus. Still, although you may feel you'll miss having a keyboard, even for quick data entry, you'll soon discover that the handwriting recognition tools are more than adequate. For me, the benefit of size reduction from getting rid of the keyboard certainly outweighs the utility of actually having one.

Looking Under The Hood: OS and Development Tools

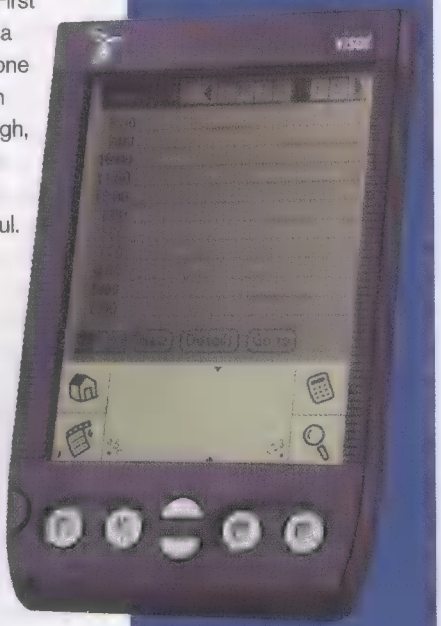
PalmOS

When I began my hunt for a new pocket gizmo, I just assumed that Windows CE was out of the question. Since one of my primary uses—symbolic math—did not exist on PalmOS, I had to look at the work it would take to port some symbolic math programs, including Yacas, to PalmOS. As a result, I registered myself as a PalmOS developer and had a look at the guts of the PalmOS in some detail. I was somewhat

shocked at how PalmOS functions. First off, it's not really an OS–it's more of a program loader running under someone else's operating system. This is much like the HP100LX, interestingly enough, except that the underlying OS of the HP100LX was DOS, which, in itself, was easily accessible and quite useful.

Unfortunately, multitasking under PalmOS is impossible. (Many feel that multitasking on a small platform is not useful; DOS recidivists used to say something similar. Both groups say this mostly because they never had the opportunity to experience the benefits of multitasking.) PalmOS also has strange data limitations, and a file system that's really a sort of database structure. Ironically, these limitations are actually responsible for the excellent performance of PalmOS. The small code segments make for efficient use of system resources. The use of database records instead of filesystem is responsible for the quick global searches. The program loader keeps everything in memory, allowing for quick switches and state retention in applications. The limited DragonBall architecture allows for the long battery life of Palm devices. But these limitations are really sometimes damning, and perhaps ultimately fatal. Because, when it comes time for these devices to be used in more demanding applications, such as multimedia, PalmOS shows its limits.

The Springboard technology developed by Handspring has been hailed as the next big thing in pocket computing, but it should not be looked at as a platform strength. It is an admission of failure for a general-purpose computing platform to need hardware add-ons to perform tasks, including MP3 playback and voice recognition, that can be done in software.



Handspring is a new company founded by the Palm Pilot's original creator, Scott Hawkins. The $149-$249 Visor incorporates a Springboard expansion slot so you can add new hardware or software modules.

Vtech's $179 Helio PDA runs a proprietary OS dubbed VT-OS, and rivals 3Com's lowest-cost products.

Windows CE

Windows CE, despite its appearance and name, is a new operating system rather than a crippled version of Microsoft's desktop software. It does appear to deserve the appellation of "operating system," unlike PalmOS and some of WinCE's desktop cousins. It allows true multitasking. It runs fairly complex software such as CAD tools, voice recognition technology, symbolic math, games, and multimedia tools with aplomb. Unfortunately it suffers from all the evils that Microsoft is known for. Mysterious slowdowns are the norm. Running out of memory can lock your system. The flawed concept of the "registry" is in place. The OS does not include a file browser, or a simple way of running executables that are not installed in the registry. The user interface to the OS is tied to the GUI; as a consequence, flakiness in the GUI can crash the OS, and the event loop sometimes seems to slow the thing down tremendously. And unlike the PalmOS, hardware reboots are often necessary.

Another damning OS feature, whether from lack of creativity or a misguided attempt to keep the "Windows experience" across the same platforms, is the decision to retain the same Windows interface in pen-based devices. This probably makes sense in their smaller "handheld" configuration devices equipped with keyboards, but it's just plain dumb in pen-based machines. To wit, taskbars and menus don't work with pens. There is software (mentioned below) which brings a relatively sane PalmOS-like, one-touch user interface to Windows CE, but you have to know about it, and then pay extra for it. Windows CE also has no sane method for closing and switching between applications. To switch or shut down programs the Microsoft Windows CE way, one must navigate three layers of menu and make three menu selections. This is simply absurd. Supposedly, the next version of WinCE will remedy some of these obscene UI deficiencies, but frankly I couldn't wait that long!

Software Availability

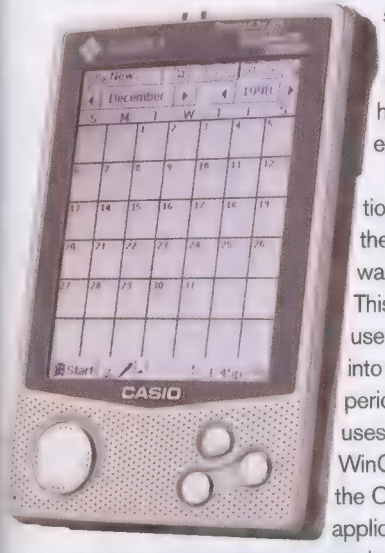
Thanks to 3Com's aggressive development efforts, there's far more software available for the PalmOS. One can even easily obtain parts of PalmOS operating system internals by signing non-disclosure agreements. Since anyone who can write code is a potential PalmOS developer, thousands of software applications have already been written. By unleashing the creativity of the hobbyist and student programmer, PalmOS has acquired many useful tools to run on its platform. This paradigm is what has made Linux and other UNIX-type operating sys-

tems such a success.

Windows CE, on the other hand, retains a proprietary compiler business model. A minimum outlay of nearly a thousand dollars is needed to get a compiler for the Windows CE platform. This effectively prevents students and hobbyists from participating in Windows CE development. Personally, I can think of a number of things I'd like to port to a Windows CE machine, including software which enables it to talk to my digital camera, but I will not shell out $1000 for the privilege of writing code for Bill Gates and gang. For the sake of argument, we'll assume the rest of the hacking and Open Source community similarly poo-poos the idea of developing for WinCE, despite the obvious hardware benefits.

On the other hand, there are lots of things that Windows CE machines are capable of which PalmOS machines are not and may never be capable of: 64,000 color 320x240 screen, picture viewer/editors, MP3 players, voice recorders. None of these are even remotely possible using PalmOS (though there will be add-on Springboard modules which add some of these capabilities for the Handspring Visor, and there is a color version of PalmOS coming down the pike shortly).

On Windows CE, however, you can play the color port of *Doom*, useful for arousing the envy of any PalmOS sporting peers. There is CAD software available, useful for viewing or modifying standard DXF files. You can even run DOS programs, albeit not so handily, using one of the two DOS emulators out there.



The Cassiopeia sports a color screen and a higher price ($599) than most of 3Com's PDA offerings.

While the built-in handwriting recognition software, *Jot*, is pretty easy to learn, there is true handwriting recognition software available in the form of Calligrapher. This amazing little program allows you to use your normal handwriting to enter data into the machine—but without the "learning period" other true-handwriting software uses. It is an absolute must-have for any WinCE user, and should be included with the OS. *Sticky Buttons*, an aftermarket application which adds a usable graphical user interface to pen-based CE machines, is also a cheap must-have, and even allows the use of themes that can be configured to match those of your Linux desktop.

So there you have it, readers. Scott's dissected the hardware, he's analyzed the software, and he's ready to make a choice. What's it gonna be? A sporty Palm VII with built-in wireless antenna, or maybe Hewlett Packard's Windows CE-based Jornada handheld PC?

Stay tuned. Next month we'll tell you what he bought, why he bought it, and give you all the tips you'll need to get your PDA to work nicely with your Linux box.

In the meantime, we want to hear from you. Which device do you think Scott should buy? Weigh in with your thoughts at www.maximumlinux.com, or send e-mail to editor@maximumlinux.com.

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Linux's Amazing Directory

Navigating the way through your new OS

Real men don't eat quiche, and they never, ever, ask for directions. But if you have any hope of figuring out this whole Linux thang', you'd better swallow your pride and equip yourself with the latest in high-tech navigation equipment because Linux can be the most confusing operating system on the planet. This article is for you guys (oops, and gals) who aren't ashamed to admit they're new to Linux and still don't know what certain directories are supposed to do, or what files are supposed to be stored where. Sure, Linux's whole

STRUCTURE

directory structure differs from Windows, but hey, it's this difference that makes it a much cooler operating system.

Come join *Maximum Linux* as we take you on a life-affirming journey, with maps in tow, through the mystical land we call the Linux filesystem hierarchy.

by Woody Hughes

ON THE SEVENTH DAY...

With all operating systems, there is a set of documents that provide standardization for their respective filesystems. What is a filesystem you ask? A filesystem is a set of files and directories that exhibit some sort of hierarchy, or organization. The underlying qualities of a filesystem are determined by what it is going to run on, such as UNIX, Linux, Windows, and OS/2. Linux once used the standard known as the Linux File System Standard, or FSSTND for short. FSSTND was released in February of 1994 in an attempt to classify or, more importantly, explain the hierarchy of the Linux operating system. In 1995, the boys and girls who were responsible for maintaining the standard sat down with a small community known as the BSD community and decided to write a standard not only for Linux, but for all other UNIX-type operating systems as well. The BSD community was comprised of individuals who were already accustomed to a standard hierarchy. That hierarchy was used in a form of UNIX called BSD, or Berkeley Software Distribution, which was invented by Bill Joy back around 1980. Over time, the whole standard has undergone some modifications and is now simply known as File Hierarchy Standard, or FHS. Most UNIX-type operating systems adhere to FHS, but some companies alter the standard for their own respective distributions. Because of the variations, we've focused this article on FHS using Red Hat's implementation.

THE ROOT PARTITION

First off, before we get too involved with all these crazy terms that you've become accustomed to, let's look at what a partition is. A partition, or disk partition, is an area on the hard drive that contains a filesystem. Some guys and gals out there refuse to call it anything but a disk partition, and some even call it a disk slice. Whatever you call it, just make sure it has Linux on it, ok?

The root partition requires content allowing the system to boot, restore, and recover or repair the filesystem. Of all partitions, this one is the most important. It needs to have the necessary content present in order for a proper bootup to occur, and needs to permit access to certain configuration files. The root partition should also have utilities available, so that the maintainer of the machine will be able to restore, recover, or repair anything. These utilities are commonly stored in the /bin and /sbin sub-directories. The root partition should be kept as small as possible as there is less chance for corruption with a small partition. Do not get this confused with the /root directory, as the /root directory is specifically reserved for the user "root".

Amazing Directories

The following are directories that should be in your root partition:

/bin User and systems administration binaries.

/sbin Systems Administration binaries run as root.

/etc Configuration information.

/dev Device files.

/lib Shared libraries and kernel modules.

/mnt Temporary mounting points for hardware such as CD-ROMs, tape backups, Zip drives, etc.

/opt Optional add-on software directory.

/tmp Stores temporary files generated by software packages.

THE /BIN DIRECTORY

The /bin directory usually contains executables, or programs, primarily used for system administration purposes, but may also contain user specific binaries. The commands that reside in this directory are required for single-user mode, sometimes known as "maintenance mode." Any programs not essential enough to be in the root partition should be stored in /usr/bin instead, such as mail, sendmail, etc. Required commands are cat, chgrp, chmod, chown, cp, date, dd, df, dmesg, echo, ed, false, kill, ln, login, ls, mkdir, mknod, more, mount, mv, ps, pwd, rm, rmdir, sed, setserial, sh, stty, su, sync, true, umount, and uname. You'll soon discover, depending on certain distributions, that restoration commands such as tar, gzip, gunzip, and zcat are located in /usr/bin. These should generally be placed in /bin, but this is not required to meet the FHS standard.

THE /BOOT DIRECTORY

The /boot directory contains everything that is required to properly boot the machine. In short, everything the kernel requires resides here. No user-mode programs have any configuration data in this directory. You will find that on many distributions, if not all, the kernel images (named vmlinuz or vmlinux) reside in this directory. FreeBSD OSes generally keep their respective kernel images in the / directory, or the system root directory.

THE /DEV DIRECTORY

The /dev directory pretty much speaks for itself. It is the "device" directory. The nice thing about most Linux distributions, and UNIX distributions for that matter, is that they already have all the devices you'll ever need when you install the OS. Rarely will you ever have to create one. A useful script, MAKEDEV, is located in the /dev directory to create new devices as needed.

THE /ETC DIRECTORY

The /etc directory contains 95% of the configuration files and directories which the operating system and user-mode programs need. In order to be within the standard scope, no binaries should ever be placed in /etc. You'd have a long night if someone decided to delete this directory.

securetty This file is edited by the System Admin to restrict which tty's, or terminals, root can log in on. This is an effective way of prohibiting remote root sessions, such as a user trying to telnet into a particular Linux machine as root.

Etcetera, Etcetera, Etcetera

Here's a list of files that you will probably notice right off the bat if you've been using your Linux box for any reasonable amount of time:

HOSTNAME The hostname of the machine.

fstab A table listing the filesystems and partitions which are available to be mounted at boot time.

group A listing of group names which contains all accounts.

passwd The file containing account names and their respective User IDs (uid), Group IDs (gid), as well as their encrypted passwords, if the OS is not using the shadow password suite.

shadow This file is created in the /etc directory when the System Admin is using the "shadowed password" suite. This is basically a file which stores the account names and encrypted passwords with a mode of read/write access for root only. On most distributions this is pretty much enabled by default. It subsequently makes it harder for someone to be able to ftp in through a known vulnerability in the ftp service, or as a regular user, and download your passwd file.

lilo.conf This file contains configuration information for LILO, the standard boot loader. lilo.conf is rather nice in that you can configure it to boot from a floppy, as well as boot multiple operating systems.

motd This file is basically a text file for the message of the day, the message that appears once a user logs in.

profile A system-wide, global file which contains detailed instructions for the exporting of environmental variables, such as LD_LIBRARY, HISTFILE, etc.

syslog.conf A configuration file used to define what is logged, and where it is logged.

hosts This file contains numeric Internet addresses known as ip addresses as well as the name of the local machine, or hostname. It is also used to specify other machines on a Local Area Network.

hosts.allow A configuration file which contains those networks, or machines, which are allowed to connect to any of the services listed in the /etc/services file.

hosts.deny A configuration file, much like hosts.allow in form, which contains those networks, or machines, which are denied access to any of the services listed in the /etc/services file, unless overridden by the hosts.allow file. The format of this file is as follows:

```
daemon list: client list
ALL: ALL
ALL: .maximumlinux.com EXCEPT
foo.maximumlinux.com
```

Woody says: *The first rule denies ALL hosts and networks connection to ALL daemons (services). The second rule denies the entire maximumlinux domain access except for: foo.maximumlinux.com. Note the period before the domain name in our second rule. It's used as a wildcard for all subnets within the maximumlinux domain.*

inetd.conf The inetd configuration file is for configuring those programs which are started by inetd at boot time. As a Security Administrator of a company, this is the first file you should edit to close those services that you don't need. Well what is a service? A service is a program that you are permitting others to use. These programs sit on certain ports on your machine and they wait for someone to come by and request to use them. If they meet certain criteria, then they are allowed to "connect" to the machine, or use that particular service. Where can I find a list of all these services? Easy. Check out the /etc/services file. Pretty cool, huh?

printcap The printcap file contains information for those printers which are connected to the particular machine.

resolv.conf This configuration file indictates how a valid hostname will be resolved by using a nameserver. The format is as follows:

domain	<domain name>
nameserver	<primary nameserver ip address>
nameserver	<secondary name server ip address>

services The services file contains all the services which have names, along with the respective ports where they reside, or "listen." The protocols they use are also listed in this file.

THE /HOME DIRECTORY

The /home directory is pretty standard in all UNIX and Linux flavors; however, because the /home directory can become quite huge with user accounts and what-not, we encourage you to keep it on a separate partition. The /home directory has a standard of /home/<account> as its directories, but you will find that many places, such as universities, divide their students into "subdivisions" for better organization. For example, they may name their directories /home/staff, /home/students, /home/guests, etc. The account directories which are stored within /home contain configuration information for particular users as well as their respective Webpages. Users also often upload their Webpages in ~/html.

Woody says: *Whenever you see a tilde (~) at the beginning of a directory, it implies a user's home directory, so, in this example, we have: ~/home/joeuser/html.*

THE /LIB DIRECTORY

The /lib directory means exactly what you think it means. Within its catacombs are the libraries for all user programs in the operating system. This directory also contains the modules directory which contains those modules which the user has built when he or she built his or her kernel. If you're wondering what a module is, it's pretty simple. A module is code that can be inserted into a kernel while it's running which will give you support for whatever you compiled the module for. The format of the modules directory is usually expressed as the kernel version, i.e.: /lib/modules/2.2.12-20/.

THE /MNT DIRECTORY

Personally, we don't feel that this directory should be included within the root partition. For some reason, the folks who decided to set the standards for UNIX and Linux thought that this was appropriate. Their main reason for deciding to implement this in the root partition is ease of access to any backup media which may reside on these "temporary" drives, making it possible to restore or repair the root partition. From what we've seen, if someone corrupts their root partition badly enough, they're not going to be able to access the mount command

Amazing Directories

to mount these devices anyway. Different strokes for different folks, we guess…

The /mnt directory is classified on most UNIX based operating systems as a temporary directory used to mount those drives needed for "temporary access". These include the CD drive, floppy, tape, Zip, etc. Since you'll mount these drives quite frequently, you may find it easier to create a directory on your root partition called /dvd, for your DVD, /cd-r, for your CD-R, /floppy, for your floppy drive, and so on. Of course, you may choose whatever naming convention you like. Pick your poison, but rest assured that, whatever you choose, you will still remain in the "standard" as long as you keep it on your root partition. To add to this, the popular GUI interface, GNOME, provides a file manager that automatically mounts a CD or floppy when one is inserted–a nice feature, indeed.

THE /OPT DIRECTORY

The /opt directory is mainly used for the addition of add-on software. All binaries, libraries, documents, and Man Pages for each respective package should be stored in their own appropriate subdirectory within /opt. Configuration files should be stored in /etc/opt.

Woody says: *I don't really hold to this standard myself. It just seems unnecessary. Why not put everything in /usr/local, since it's going to be run locally anyway? I've never understood this directory. Many times, you'll see that a window manager such as KDE will be installed here under /opt/kde and, in that respect, it holds to the standard. Personally, I find it a waste of directory space.*

THE /ROOT DIRECTORY

The /root directory is another "optional" directory which you don't really need, since you could always make a root directory for the user root in the /home directory. Contrary to conventional belief, it does not have to reside on the root partition. The root directory is nothing more than another directory for a user, containing all the configuration files it needs. This is the same as all the user directories in the /home directory. Root is just another user like sally, or bob, or heck, woody. The only difference is that the root account is god and should never be used, except for systems administration.

THE /SBIN DIRECTORY

The /sbin directory is where you should keep all your utilities for sys admin. All of these programs are run as root. For programs which run for the purpose of user administration, use the /usr/sbin directory. As a general rule, you should never have to run anything from the /sbin directory. If that is the case, then their binaries should be placed in one of the /bin directories, such as /usr/bin or /bin.

THE /TMP DIRECTORY

All programs that create temporary files at run-time use this directory, a practice that has come under intense scrutiny in recently because of security issues. There are conditions in which an attacker could circumvent a running program's temp files to obtain root access. Unfortunately, you can't just go in and make the /tmp directory root-only read/write accessible as there are many programs which run as their own user id and need access to that directory to store their temp files. This is where

Windows Directories: A Comparison

By now, you've ascertained that there is a HUGE difference between Windows and Linux directory structures. Although Linux users will always slam Microsoft for its shortcomings, including bad security and major code bloatness, the fact is that the Microsoft Windows directory structure is simple and works very well. For comparison, the c:\windows\system directory on Windows 95, for example, is much like the /lib and /usr/lib directories in Linux, in that both house important libraries for the proper operation of programs. The root partition in Linux offers more flexibility, though, and you can separate it from the rest of the file system to keep it small and reduce the likelihood of disaster. Windows differs in this respect. If one single file within Windows, such as command.com, is corrupted and not reparable, then you might as well pack your bags, folks, because a long night is ahead of 'ya. That's just how Windows is. Its simplicity brings about disaster. Notice also that both root directories are exactly the same on both operating systems. This actually seems to be a standard for most operating systems. In Windows, we have c:\. In Linux, we have "/"...

There is another directory in Windows that bears a striking resemblance to Linux: the program files directory. If you take a good look at the hierarchy of c:\Program Files, you will find that it closely resembles /usr. Like Linux, most, if not all, programs have their own directories. The only difference is that the standard in UNIX encourages separating binaries into a directory designated specifically for binaries, hence /usr/bin.

All in all, Windows and Linux do share a few common things, but when it comes to overall directory structure, Linux has the edge. Why? Because it allows greater flexibility. You can do anything you want in almost any fashion and still be within the Filesystem Hierarchy Standard. Flexibility and open source are the key to Linux's superiority.

proper vendor patches for software packages come in.

THE /USR DIRECTORY

The /usr directory is the big boy on the block and should be mounted on a partition separate from the root partition. Remember, you want to keep the root partition as small as you can. You'll find most of your user binaries in /usr/bin with standard system binaries in /usr/sbin. You'll often find that programs will install themselves in the /usr hierarchy and, in turn, install their respective binaries in /usr/bin. This is correct binary placement, and vendors who make rpm packages should pretty much follow this guideline as closely as they can. Or, we hope they do!

THE /VAR DIRECTORY

The /var directory is probably the most "standard" directory in the entire Linux and UNIX architecture. It contains variable data, which means that the data stored in /var and its subdirectories can, and will, change constantly. Here's a list of subdirectories which reside in /var on a Red Hat Linux distro:

/var/account This directory stores process accounting logs if the operating system supports this function.

/var/lock This directory holds the lock files created by most, if not all, programs.

/var/log This directory holds log files generated by the system.

/var/mail Users' mailbox files, where incoming and outgoing mail is stored for each user.

/var/opt This directory stores variable data for /opt.

/var/run Certain files relative to running processes are stored here.

/var/spool Spooling data for various applications is stored here.

/var/tmp This is typically linked to /usr/var for temporary storage of program data.

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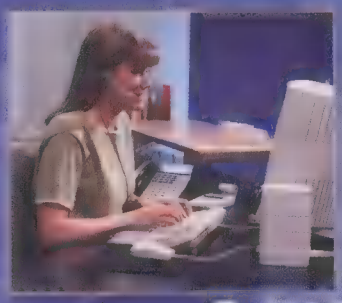

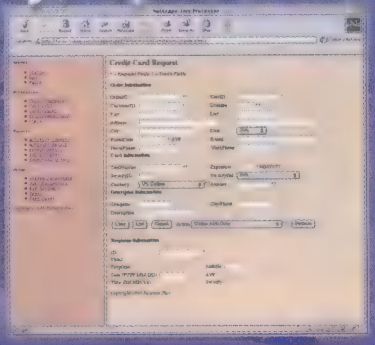

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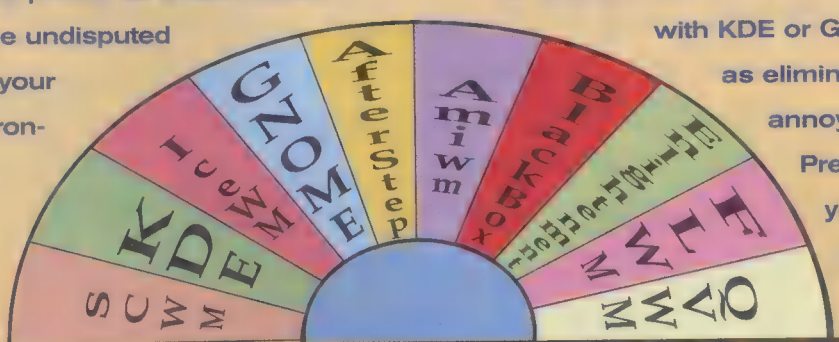
THE POWER USER'S GUIDE TO KDE AND GNOME

CHOOSING THE WINNING GUI FOR YOUR LINUX BOX

There's no better feeling than sitting in front of your computer and knowing exactly what you want to do—and how you're going to do it. Every movement feels fluid and calculated. Keyboard shortcuts fly from your fingers. Applications execute tasks with the utmost precision. Startled onlookers gasp at your speed and efficiency.

Cool beans. Unfortunately, the only way you're going to pull off all these moves is by being the undisputed champion of your desktop environment. And since Linux has gleefully attached itself to your box, you're going to have to learn how to spin to win with the right graphical environment. Unlike Windows or the MacOS, Linux really doesn't have a "standard" interface—unless you count its less-than-exciting command line—but we think KDE and GNOME ("K&G") are your best bets for ensuring a victory celebration.

That said, we're going to show you how to execute some new and useful tricks with KDE or GNOME, as well as eliminate a few annoyances. Prepare to whip your GUI skills into shape.



by Aldo Cimino

Round 1: SIMPLICITY

You're probably wondering why we're so fixated on KDE and GNOME. Although there's a myriad of alternatives available, K&G are more widely adopted and both are complete solutions. Both also provide a window manager and a desktop environment which (ideally) work together whenever possible to make the desktop experience seamless and complete. K&G also provide simplified solutions for developers, who can write apps that take advantage of a standard for such things as widgets, panels, menu placement, and the like.

Round 2: VISIBILITY

When applications are being developed for Linux, chances are they have KDE or GNOME in mind. And with a high installed-base for both environments, development is widespread and feature-rich. When people talk about competing with Windows on the GUI front, they're talking about KDE or GNOME.

Round 3: PHILOSOPHY

K&G aren't out to build a better xterm for UNIX gurus. Both projects strive for usability and productivity first. This means, among other things, that help files are a priority, as is an intelligent and intuitive layout. While K&G's current success in any of the above areas is open for debate, the fact remains that KDE and GNOME are on their way to bringing you everything you could ever want from a GUI.

Round 4: GUI AGNOSTICS

An important aspect of any graphical environment in Linux is how it provides access to a virtual terminal. Making serious use of your system is often a measure of the distance between you and a command line. While you can "GUI your way" through just about any task, being efficient means recognizing the quickest and most unobtrusive way to go about things. Let's consider a few important and often unavoidable tasks:

- Installing software
- Editing lilo.conf
- Editing fstab

All of the above tasks usually require that you log in as the root user, and if you insist on going the GUI route, this can mean logging out and restarting X. You can remedy the situation, however, by bringing up a virtual terminal and typing "su" followed by the root password. This will give you root access to just about anything on the system.

Case in point: Let's say you wish to configure your system to boot Windows as well as Linux. To do this, you can do either of the following:

As you can see, the terminal method produces noticeable speed gains with less hassle.

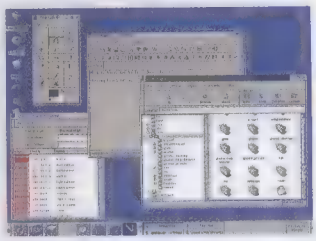
You should become intimately familiar with it.

A GUI METHOD	A TERMINAL METHOD
• Log out • Log in as root • Restart X • Use "linuxconf" to configure lilo.conf • Log out • Log back in as yourself • Start up X	• Bring up a virtual terminal • Use "su" to gain root access • Edit lilo.conf with your favorite text editor

Round 5: THE WAR OF THE WORLDS

It would be an understatement to say that KDE and GNOME have been at the center of scrutiny in the Linux community. Both projects, for differing reasons, have elicited the ire of Linux users, primarily due to licensing issues. Early concerns regarding whether or not the building blocks of KDE, the Qt toolkit, were "truly" Open Source led many to denounce KDE. For them, the future of the Linux desktop had to be open. The GNOME project was started as a response.

Today, a few revisions later, Qt (and by proxy KDE) is considered to be honestly Open Source by all but the most frothing, rabid advocate. The KDE and GNOME teams continue to progress, competing but also cooperating. Who will win? Who can say?



Bonus Round: FINDING GNOME OR KDE

If you're wondering how to get the latest version of GNOME or KDE, both can be had at the many mirror sites available. However, if you're already running a version of GNOME or KDE, it's often a good idea to use your distribution's ftp site for updates. This will help avoid compatibility problems with any special customizations made by your particular brand of Linux.

KDE: www.kde.org/mirrors.html
GNOME: www.gnome.org/ftpmirrors.shtml

Mastering KDE

K is for konsole

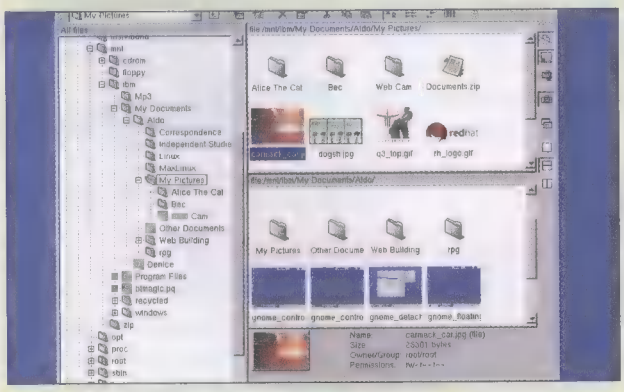
KDE provides several ways to access the command line. The first is to simply bring up its flagship virtual terminal, konsole. The second is to employ the keyboard shortcut, Alt-F2. Pressing Alt-F2 will bring up a thin, single-line prompt at the center of your screen. From here you can bark short, dictatorial commands at your computer. This is particularly useful in starting apps and killing misbehaving processes.

The third, and perhaps most useful, is used in conjunction with KDE's file manager, kfm. While browsing your files in kfm, you may find yourself compelled to copy, execute, or edit files that your normal-user identity can't (or shouldn't) touch. Pressing Ctrl-T will not only launch konsole–it'll launch it in the directory you are currently browsing. This saves you from bringing up a terminal and having to cd into an impossibly long directory path. From konsole, you can su into root, and edit or execute the files once out of your reach.

Kfm and Kruiser: The Dynamic Duo

Kfm is a capable file manager and, in addition to having drag-and-drop features, also doubles as a stripped down Web browser. What makes kfm important is its seamless integration with the KDE desktop–basically, wherever you go, there it is. However, it does have its own share of oddities and problems.

Consider that the Linux file system is a relatively large, complex hierarchy of folders. If you want to get your bearings and know where you are and exactly what you are



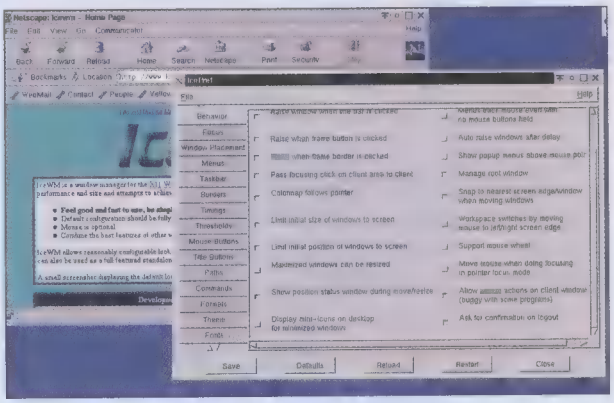
doing, you'll probably want to set your preferences in kfm to "long view." This will display folders and files as small icons. But this presents its own problems. Kfm's DND features have a glaring error: When copying or moving files, you receive little visual feedback. So, if you happen to be merrily dragging your most important document into another folder, kfm will not highlight, indent, or otherwise let you know where the file may actually end up. This means that final thesis of yours could be moved into any of your nearby folders and you'd be none the wiser. It's a minor annoyance, but

Mastering GNOME

GNOME Terminals and Mini-Commander

GNOME, like KDE, has its own virtual terminal called, wittily enough, GNOME Terminal, which possesses a great deal of customizability and functionality. In addition to this, GNOME also lets you throw a short command while browsing its file manager, GMC. Press F2 and you'll be presented with a single line prompt.

One of the most important console programs in GNOME, however, is an applet called mini-commander. Mini-commander builds a small virtual terminal into your GNOME panel. Think of it as a bullet hole to the CLI, providing you the necessary access to rattle off quick instructions.



File Management the GNOME Way

GMC, GNOME's file manager, has a lot going for it. Besides having a familiar, functional interface, it sports a few capabilities that kfm lacks. This includes, of course, actually providing colored highlighting to folders that you are moving or copying files to. Nonetheless, in some ways, GMC may not be immediately intuitive when compared to other file managers.

If you're used to either kfm or Windows Explorer and miss having copy, delete, and other such buttons available, you can still make do with GMC. Click on File, and then click on the area that appears serrated directly below it. This will allow you to detach the file menu, making available a few single-click options for easy access. If you like this sort of thing, you can detach and float menus wherever you see the dotted lines.

HOT TIP!

In Windows Explorer, to drag-and-drop with the option to move or copy, you right-click and drag. In kfm, you left-click and drag. In GMC (you guessed it), you middle-click and drag. If you're using a two-button mouse, it's best to configure it to simulate a three-button mouse. This way, clicking on both the left and right mouse buttons simultaneously will simulate a "middle click."

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Mastering KDE

remember: Small problems can quickly add up to a major annoyance. Thankfully, you can help the situation by editing your kfm preferences to "allow per-URL view." From there on, it's a good idea to set the preferences in your /home folder to use large icons, and nearly everything else to use small icons. With larger icons in your active folders, you'll actually have some idea where you are copying and moving files to, while retaining a good bird's-eye view of your file system in other folders.

But this is just a stopgap measure. When you need to get serious with file management, it's time to bring in the kruiser. Kruiser is best described as a KDE explorer and, with its two-paned interface, it conjures up fond memories of Windows Explorer. What sets kruiser apart from both kfm and Explorer are its unique features. First off, and unlike kfm, kruiser gives you highlighting as an indication of where you are moving/copying files to. In addition, kruiser can display a small thumbnail of image files, allowing you to sort and organize disparate pictures with ease. More impressively, kruiser can also morph into a three-paned interface, allowing you maximum flexibility in GUI file management.

With all these benefits, you may wonder: Why use kfm at all? Unfortunately, kruiser is not compatible with kfm. You can't trade files between them, nor can you drag a file from kruiser onto the desktop, or vice versa. Because kruiser is a veritable island unto itself, it's a good idea to keep kfm handy as well.

Mastering GNOME

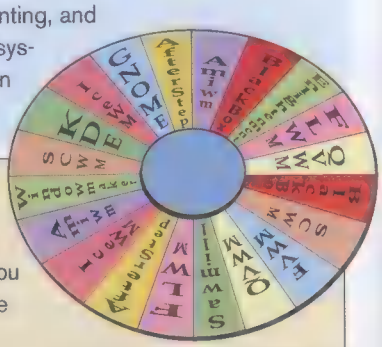
My Kingdom for a Vacuum Pump

Using an analog modem is a bit like trying to swallow the ocean with a straw. It's frustrating, slow, and continued exposure can make you sick. Luckily, programs do exist to treat the symptoms.

Webdownloader is an excellent GNOME app in the tradition of such Windows utilities as GoZilla and GetRight. Essentially, it allows you to restart broken downloads, which happens more than you might prefer. You can also schedule downloads for later, when you're busy doing something else or away from your computer. It is surprisingly feature-rich, and while other projects have tried to make a similar program for Linux, few have approached the usability and stability of Webdownloader.

Maximum Fish Applets

Sure, you can make a little fish swim around on your GNOME panel, but let's face it–you'd rather do something worthwhile with your system resources. GNOME applets are often best used to monitor activities in real time. For instance, try collecting a variety of applets that can serve as a "system monitor." Use them to setup a small panel that displays disk, swap, and memory usage, as well as cpu utilization, drive mounting, printing, and the like. Best of all, your "system monitor" can be hidden and exposed at your whim.



Window Managers Galore

They may not have the spit and polish of a desktop environment, but the sheer number of viable, standalone window managers available for X is startling. And if you feel the sudden, overwhelming need to valiantly strip yourself of what little user-friendliness Linux currently possesses, you can choose to run any one of them in the absence of KDE or GNOME.

***Maximum Linux* will cover some of these in more depth in future issues, but in the meantime, here's a short breakdown:**

- AfterStep
  Although AfterStep was based on NeXtSTEP, it is now thoroughly its own creature.
- Amiwm
  Amiwm promises to make your desktop look very much like the old Amiga.
- BlackBox
  BlackBox is fast and simple. It doesn't try to be much more.
- Enlightenment
  Enlightenment can make your desktop look like just about anything.
- FLWM
  Flwm sports such novel ideas as sideways title bars, and is quite speedy.
- FVWM
  A classic, somewhat nondescript window manager.
- IceWM
  Light and fast, IceWM is the perfect compliment to GNOME.
- QVWM
  Qvwm does its very best to look like Windows9x at all times.
- Sawmill
  Regarded by some as the next "official" GNOME window manager, Sawmill is stable and extensible.
- SCWM
  Originally based on fvwm2, scwm touts its dynamic configuration language.
- Window Maker
  Window Maker tries its best to look and feel like the NeXtSTEP environment.

Mastering KDE

For Want of Apps: KHotKeys

Most users have several applications that they use frequently. Easy access to these is a must, and the quicker the better. KHotKeys allows you to setup any number of keyboard shortcuts to execute a variety of tasks. KHotKeys can be found in the KDE control center under Keyboard. When you load it, you'll be presented with an easy interface to setup your shortcuts. If you want to really tweak KHotKeys, read the docs. Simply typing the path of the application and the key binding you wish to tie it to will suffice.

Tying a few of your apps to a Ctrl- or Alt- combination is a bad idea. Most applications bind their shortcuts to either of the two, which means you could end up launching *Gimp* when you simply wanted to copy text. Our preferred solution is to use the left-shift key and the numbers 1 through 5, providing five quick, one-handed shortcuts. Our setup looks something like this:

Shift-Alt-1: konsole
Shift-Alt-2: kppp
Shift-Alt-3: Netscape
Shift-Alt-4: WordPerfect
Shift-Alt-5: Gimp

HOT TIP!

One of the most annoying things about KDE is its inability to copy links directly from the K menu to the desktop. A quick way to circumvent this problem does exist. Open up kfm and under Edit select Applications. You should be taken to "/home/username/.kde/share/apps/kfm" where you can copy any number of links currently listed in your K menu to the desktop.

If you need to squeeze out a little more performance, alter your window properties in the KDE control center so that windows do not show their contents when resizing or moving. Similarly, set kfm to only display text.

The Future of KDE

KDE 2.0 is coming. Sooner than you think–late Spring, early Summer. When it arrives, it's going to spend a disproportionate amount of its time kicking some ass.

Some noteworthy features of KDE 2.0 include:

- Java, Javascript
- Extensive Theme Capabilities
- New Window Manager
- Improved Web Browser/File Manager
- Application Embedding
- Caching Frequently Used Data

For more information on the technologies involved in KDE 2.0, visit: www.kde.org/technology.html.

Mastering GNOME

Enlightenment: The Fudge Maker

Unlike KDE, GNOME does not have its own window manager. Thus, your experience with GNOME often has a lot to do with what window manager you're currently using. At present, Enlightenment (or simply "E") has been branded the "official" GNOME window manager, and most distributions have set it up accordingly.

Enlightenment is easily the most customizable window manager available, and gives you the ability to micromanage your windowing experience down to the tiniest detail. But while Enlightenment may be able to make your desktop look like alien intestines, it's not exactly world-renowned for its stability or speed. If you're looking for that extra bit of performance, it may be time to put E to sleep.

Putting GNOME on ICE

Enter IceWM–the lightweight GNOME-compliant window manager. While not nearly as customizable as E, IceWM is incredibly fast and sports a small memory footprint to boot. If your computer isn't exactly top of the line, these qualities will shine even brighter. Do yourself a favor and download the excellent IceWM configuration tool, IcePref. IcePref's comprehensive menus will save you from plowing through text files to tweak IceWM to your liking.

HOT TIP!

One of the most perplexing but minor problems you may experience with GNOME is getting your icons to display transparent text. Let's face it, those little blocks of gray ruin an otherwise beautiful desktop. To rid yourself of them forever, look under GMC preferences, select the Desktop tab and choose "Use Shaped Text."

The Future of GNOME

GNOME is preparing its own round of gloating for mid-2000, when GNOME 2.0 is expected to arrive.

Some noteworthy features of GNOME 2.0 include:

- New Configuration System
- New Image Loading System
- New File Manager
- GNOME Virtual File System
- More Icons
- Antialiasing

For more information on the technologies involved in GNOME 2.0, visit: www.gnome.org.

www.lokigames.com

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Railroad Tycoon II
Quake III Arena
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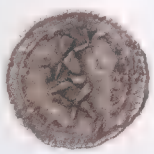

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SIMPLY UNREAL

If you haven't played *Unreal Tournament* yet, you're missing out on one of the most exhilarating Linux experiences known to humankind. You may think it was nice of us to include an in-depth review, game tricks, server tweaks, and installation tips, but the truth is, we just wanted to frag your ass but good. If you have any hope of frogging ours, you'd better read the following six pages post haste.

See you on the battlefield!

by Michael Luton

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HOW TO KILL THE INTRO MOVIE

After you've been running *Unreal Tournament* for a while, you'll get mighty tired of that opening sequence with the whole, "The year is 2291. In an effort to stop violence among deep space miners, the New Earth Government has legalized no-holds-barred fighting..." crap. If you're like us, you'll just want to get into the game as fast as you possibly can. You can greatly speed up *Unreal Tournament's* startup time and skip the intro movie in one quick step. Open up the UnrealTournament.ini file and look for the line LocalMap=CityIntro.unr. Change CityIntro.unr to UT-Logo-Map.unr. Now, when you start the game, you'll see the *Unreal Tournament* logo against a black background. Press ESC to bring up the GUI interface. Doing this reduced our startup time from 23 seconds to 10 seconds. Your mileage, of course, may vary.

Unreal Tournament

A VERITABLE BLAST TO PLAY

Unreal Tournament is a perfect example of what a fast-paced, arcade deathmatch game should be. What makes Unreal Tournament even better is that you can play it on the OS of your choice. No, not BeOS, you fool! Linux!

Unreal Tournament is primarily a multi-player shoot 'em up, but that doesn't mean you need to have a network connection to enjoy the game. There's also a strong single-player mode that includes more than forty maps across four different game variations. When you've climbed to the top of all four ladders, you're free to take on the tournament's Grand Master. But–surprise, surprise–he's not your typical end boss with kitty litter for brains–you'll find yourself having to develop an actual strategy in order to beat him! Which brings us to one of the most impressive aspects about *Unreal Tournament*–the artificial intelligence.

The bots in *Unreal Tournament* are the most realistic you're likely to encounter in any game out there today. Hell, the AI is so good, there'll be times when you forget that you're actually playing against the computer. The teamplay mode is where the bots really shine. Using an onscreen menu, you can order the bots on your team to perform tasks appropriate for whatever game mode you're playing. For example, in Capture the Flag you can order a couple of bots to guard the flag and another to provide cover while you make a run for the enemy flag. We especially loved how the bots assigned to guard duty can find the best sniper spots around the base to stop any potential flag-takers. They know where the choke points are and pick the right weapons for their location! Our only complaint is that, no matter how hard we tried, we could never manage to get the bots to go on the offensive and make a flag capture without direct help. But this is a niggling complaint. Rest assured, you'll not find better AI in any other game. Period.

Of the four different modes of play, Assault is the most innovative and our personal favorite. Players are divided into two teams–attackers and defenders. The attackers are given a series of objectives to complete, usually involving pushing a button or destroying some object. The defenders, on the other hand, are supposed to do everything they can to stop the attackers from accomplishing their goals. In the single-player version of Assault, you start out on the attacking team. Once you have successfully completed your objectives, your team become defenders. You must defend against the other team for the same amount of time it took you to win the level you achieved as an attacker. There are several great linear and non-linear maps dedicated to Assault mode, including an amazing *Saving Private Ryan*-inspired level that has you attacking a heavily fortified beachhead. It's very difficult, but also very rewarding.

The other modes include Deathmatch, Capture the Flag, and Domination. Most of you are probably already familiar with the first two, but Domination is brand new. Each map has three control points represented by floating symbols. Players are divided into two or three teams and must "own" as many control points for as long as possible.

The maps themselves are well designed and exhibit a great deal of variety, so you won't get bored looking at the same textures and architectural styles repeatedly. The game's designers really focused on coming up with new and interesting ideas, but in a few cases "cool design" was given more importance than "game flow." The prime example of this is the "Galleon" map, on which an

Objective #1 is complete. The big mechanical thing with dials has been destroyed. Notice how you can see the amount of health your teammates still have remaining.

You think you're going to take on this Egyptian-looking dude with only a Hand Blaster? We don't think so...

old ship is floating in the middle of a sea. The transparent water covering the floor of the bottom deck is a nice touch, and the map overall is visually stunning, but as beautiful as it is to behold, the overall game flow feels very stilted and slow. However, when you factor in that *Unreal Tournament* ships with over 50 maps, it'd be difficult to ding the game for a few such "novelty" maps.

The weapons in *Unreal Tournament* are also some of the most satisfying and balanced we've seen in a long time. In fact, there are really only a couple of weak ones—namely the pistols and the Bio Rifle that shoots green globs (Nickelodeon should buy the rights). Thankfully, since it's as easy to chalk up kills with one gun as it is with another, you have the luxury of selecting the weapon of your choice. If you're a fiend with the rail gun in *Quake* (and who isn't?), then you'll love the Shock Rifle, which inflicts instant—and massive—damage on your unlucky opponent. *Unreal Tournament* even breathes new life into the Rocket Launcher by allowing you to load up to six rockets to be fired at one time! Oh yeah!

Unreal Tournament is unquestionably the new standard by which all other multi-player 3D action games will be judged. Other companies seem content with merely refining a proven formula, but Epic's refined the concept coming up with a few new formulas of its own. Linux is a great operating system, and it's nice to see Epic putting out a superior game for it.

Unfortunately, the same superior rating doesn't apply to the game's Linux support. Although there's a friendly penguin logo on the retail box, the Linux version is nowhere to be found inside! Read the small print in the "System Requirements" area, and you'll discover that the Linux patch must be downloaded from www.unrealtournament.com. Not a big deal, but it would've been nice to have the initial Linux patch in the box, even if publisher GT Interactive doesn't actively support it. As such, this little oversight robs *Unreal Tournament* of what would otherwise be a perfect score.

Unreal Tournament has some of the best special effects this side of Quake III. Here's what you look like when carrying the Ultra Damage powerup.

MAXIMUM LINUX VERDICT

Price $55
Company GT Interactive
Phone 800.610.4947
URL www.unrealtournament.com

TWEAKING THE MOUSE

Professional FPS players are primarily concerned with how a game "feels." More often than not, that feel is almost entirely a result of the game's mouse control. The only two settings you really need to be concerned about are DGAMouseEnabled=True in UnrealTournament.ini and MouseSensitivity =11.0 in User.ini. The sensitivity value of 11 is our personal preference. You can also set mouse sensitivity from within the GUI, so play around with it a bit to see what works best for you.

REQUIRED

3D Card Support
Glide (3dfx)
Multiplayer
TCP/IP | LAN
Total Players
16

HIGHS

- Great graphics
- Multiple modes of play
- Satisfying set of weapons
- The best AI we've seen

LOWS

- Linux version must be downloaded
- Only supports 3dfx cards

INSTALLING THE GAME

At press time, 4.02 is the most recent version of *Unreal Tournament* for Linux. By the time you have this magazine in your hot little hands, however, version 4.05 or later should be available. When the first Linux patch for *Unreal Tournament* was released, it used the Loki installer to greatly simplify the installation process. Unfortunately, there were a couple of problems with the installer that prevented the game from running properly, forcing you to install the game manually. Version 4.02 was released shortly thereafter, but didn't include an updated installer. According to Epic, the 4.05 patch should have the fixed installer included, so if you're installing the game for the first time, you can go straight from the 4.05 patch and simply run setup.sh. As it stands now, here's what we did to get *Unreal Tournament* 4.02 running on our Red Hat 6.1 system:

The start of this Assault level looks serene enough, but in about five seconds the bullets will be flying and the blood will be flowing faster than the booze at a Hollywood party.

Step One: We had to install the 3dfx drivers for our dual Voodoo II cards: the 3dfx Device Driver and then version 2.x of Glide. Yes, *Unreal Tournament* only supports 3dfx cards for hardware acceleration. We should also note that *Unreal Tournament* only seems to run with Glide 2.x. We had initially installed Glide 3.x, but whenever the game started up we would get a segmentation fault. Uninstalling Glide 3.x and installing Glide 2.x fixed that problem and will the fix the problem for you too!

Tip! Check out linux.3dfx.com/open_source/drivers.htm to get the latest drivers for your 3dfx card.

Step Two: We then placed the *Unreal Tournament* CD in the CD-ROM drive and mounted it. After extracting the contents of UTLinux400.tar.gz in our home directory, we then ran setup.sh. Yes, we already knew the installer had problems, but that's okay since applying the 4.02 patch fixes everything.

Now that the initial game was installed we could update it to 4.02. But before we could, we had to download XDelta, since the patch uses XDdelta to update a few of the files. After installing XDelta you'll be able to run "install-patch" to update *Unreal Tournament* to 4.02.

Tip! Download XDelta at www.xcf.berkeley.edu/~jmacd/xdelta.html

Step Three: With everything properly installed, just switch to the UnrealTournament/System directory and run UnrealTournament. Don't be alarmed if you notice the game hanging after the splash screen on occasion. It happened to us, too, about 30% of the time. If this happens to you, just hit CTRL-C to kill the process and try it again. If it keeps happening, then it might be time to seek the help of a professional.

Tip! If you're having problems installing Unreal Tournament you should check out http://sourceforge.net/project/?group_id=975 for help on getting the game up and running. The Source Forge site is frequented by Epic programmers and various other Open Source programmers dedicated to making Unreal Tournament on Linux the best it can possibly be.

It's literally impossible for us to know how things will work on all the different distributions with hundreds of different hardware and software configurations. But in all likelihood, the 4.05 patch will be out by the time you read this, providing a much simpler install process.

The "Galleon" map is pretty to look at but the actual map leaves you wanting more.

MUTATING THE GAME

Mutators rock! No, we're not talking about radioactive substances that alter the genetic makeup of sewage life. Mutators in *Unreal Tournament* are mini-modifications that alter the basic rules of the game to create a slightly different (or mutated) version of the game. Let's take a look at the fourteen Mutators that ship with the retail version of the game:

- **Chainsaw Melee:** Replaces the Impact Hammer with a Chainsaw.
- **Fat Boy:** The more damage you deal out, the bigger you get. The more damage you take, the skinnier your character gets.
- **Flak Arena:** Only Flak Cannons are available.
- **Insta Gib:** You get one shot, one kill with the Pulse Rifle.
- **Instant Rockets:** You're not allowed to load up the Rocker Launcher with multiple rockets.
- **Jump Match:** Allows players to jump extremely high.
- **Low Gravity:** All levels have low gravity.
- **No Powerups:** Removes the Ultra Damage, Shield Belt, Invisibility, and Super Health from levels that have them.
- **No Redeemer:** Removes the Redeemer weapon from levels that have it.
- **Pulse Arena:** Only Pulse Guns are available.
- **Rocker Launcher Arena:** Only Rocker Launchers are available.
- **Shock Arena:** Only Shock Rifles are available.
- **Sniper Arena:** Only Sniper Rifles are available.
- **Stealth:** Makes all players invisible.

You can give any of your computer-controlled teammates commands via a convenient menu system by pressing v.

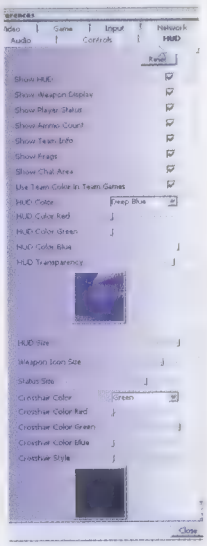
The real beauty of the Mutator technology is that you can combine several different ones in the same game. For example, you could run a game with Fat Boy, Low Gravity, No Powerups, Sniper Arena, and Stealth all at the same time. But, the very nature of certain Mutators precludes their being used with others. In other words, it just wouldn't make any sense to run both Flak Arena and Pulse Arena at the same time. In such cases, you'd only see the effect of one Mutator.

Tip! The folks at Digital Extremes (co-developers of *Unreal Tournament*) have created a set of three additional "official" Mutators you can download from www.digitalextremes.com.

Tip! A great online source is Mod Central for Unreal. It can be found at www.planetunreal.com/modcentral.

Most of the Mutators you'll find on the Internet will be in .umod format. Windows users have the convenience of simply downloading the .umod file and double-clicking on it to install the Mutator(s) contained within. In Linux, unfortunately, you can't just double-click on a .umod file. (Well, you could, but nothing good is going to happen). Whatever you do, don't lose hope–'cuz we've got a couple of cool suggestions on how to install Mutators in Linux.

The first way can be rather ugly, since it requires the use of Windows. If you have a Windows machine handy, then simply install the .umod file to your Windows version of *Unreal Tournament*. What this does is create a .u and .int file in the UnrealTournament/System directory. For example, if you double-click on de.umod, you will end up with de.u and de.int in the UnrealTournament/System directory. Copy these two files to your Linux machine (remembering to put them in the UnrealTournament/System directory) and start up the game. The new Mutators will then be detected and placed into the menu system.



Every aspect of the user interface is customizable, including every detail of the Heads Up Display (HUD).

The second way to install Mutators is a little more Linux-friendly. Mishka Gorodnitzky and Avatar (his real name is unknown) have put together a Perl script that can extract the contents of .umod files. Download umodunpack.pl from www.deepsky.com/~misaka and place it in your UnrealTournament directory. Give it execute permission by typing **chmod +x umodunpack.pl** at the command line. Now copy the .umod file you're interested in to your UnrealTournament directory. Install the .umod file by running umodunpack.pl on it. Using the example of de.umod, you would type **umodunpack.pl de.umod**. The script will tell you exactly what it extracted and where the relevant files were copied.

Should you ever want to uninstall a Mutator for any reason, (and off the top of our heads we can't think of any), you can simply delete the corresponding .u and .int file from the UnrealTournament/System directory. Easy as pie.

ARE YOU BEING SERVED?

Sooner or later you're going to want to set up a dedicated server for *Unreal Tournament*. There are two ways to do this: The easy way and the hard way. The easy way is to simply use the GUI menu system within *Unreal Tournament* and choose Multiplayer ¦ New Multiplayer Game. A dialog box will appear where you choose your desired game options. When you've selected all your options and are ready to start the game, just click on the Dedicated button. The game drops back to the console window you started it from, and the server is up and running and ready for business.

However, there may be a number of reasons why this is not feasible for some server administrators. Maybe you don't have a 3dfx card in your system but still want to run a dedicated server. Maybe your server machine is in a remote location and you use Telnet or Secure Shell to get to it. What you'll have to do in this case is edit the UnrealTournament.ini file located in the UnrealTournament/System directory and start the server from the command line.

Let's look at the UnrealTournament.ini and the most important variables to set.

[UWeb.WebServer]	
bEnabled=True	Enables Web-based administration. You're going to need this, so set it to True.
ListenPort=8181	Port the Web-based administration server listens on. Default is 80. If you already have a Web server running on port 80, then change this value to something else.
[UTServerAdmin.UTServerAdmin]	
AdminUsername=admin	User name for web-based administration application. You'll probably want to change this to something other than admin.
AdminPassword=admin	Password for web-based administration application. You most definitely will want to change this. If you don't, then anyone who knows the IP address of your server will be able to access the administration page and start screwing around with your game!
[Engine.GameReplicationInfo]	
ServerName=Maximum Carnage	The name of your server — it appears in the server browser within the game.
AdminName=Michael Luton	Your full name. Appears in the server browser.
AdminEmail=mluton@maximumlinux.com	Your e-mail address. Appears in the server browser.
MOTDLine1=Oh, you didn't know?	You get up to four lines for a Message of the Day. This appears when a player first connects to the server.
MOTDLine2=Your [illegible] better call somebody!	
[UnrealShare.ChallengeBotInfo]	
Difficulty=1	Initial difficulty level for bots if you have a minimum number of players set.
bAdjustSkill=True	Allows bots to get better or worse given the quality of the human players on the server.
[Botpack.DeathMatchPlus]	
MinPlayers=4	If there are fewer than the given number of human players connected, then UT will spawn enough bots to match the MinPlayers value.
FragLimit=30	Whoever reaches the FragLimit first is the winner in deathmatch games. A value of "0" means no frag limit.
TimeLimit=0	When a match has been running for the given number of minutes without anyone reaching the FragLimit, the map will change. A value of "0" means no time limit.
bChangeLevels=True	Advance to the next level when either the FragLimit or TimeLimit is reached. A value of "False" will keep repeating the [illegible] level.
bForceRespawn=False	Forces players back into the game after they've been killed. This prevents players from purposely staying dead in order to artificially boost their ngWorld stats.
[Engine.GameInfo]	
bAllowFOV=False	Prevents players from changing their field of view. Some people view this [illegible] cheating.
MaxSpectators=2	Maximum number of clients that can be connected [illegible] spectators.
GamePassword=blah	If you want to run a private game, then set this variable.
MaxPlayers=16	Maximum number of clients that can be connected to the server.
bWorldLog=True	Enables logging to ngWorld stats.
[IpServer.UdpServerUplink]	
DoUplink=True	Reports your server to UT's master servers. Set this to True if you want other people on the Internet to [illegible] your server. This [illegible] is not included in UnrealTournament.ini by default.

There are, of course, many other variables besides those listed here. It's a good idea to take the time to browse line by line through the UnrealTournament.ini just to see what options are available. Once you have everything set the way you want, you can start your server. Make sure you're in the UnrealTournament/System directory or have it in your PATH and type **ucc server DM-Turbine** at the command prompt. DM-Turbine is the name of the map you use to start the server. Since we're going to use the Web-based administration tool to set up our "real" game, it doesn't matter what map we pick to start.

Some pictures are just too beautiful for words. Yes, those are our very own rockets headed right for Cryss's midsection. Poor Cryss.

WEB-BASED ADMINISTRATION

Once you have a server up and running, you can use *Netscape* to do basic administration. If you started the server via the command prompt, then this is where you'll want to choose the game type, map, and any Mutators you want to run. Start up *Netscape* and go to http://localhost:8181/ServerAdmin. Your port number may vary depending on what you specified for ListenPort in UnrealTournament.ini. Also, if you're not actually on the machine on which you started the server, then localhost should be replaced by the IP address of the server. You should be prompted with a standard authentication login dialog. Enter the userid and password specified in UnrealTournament.ini and you'll be set to go.

There are four different sections of the Web-based administration utility:

Current Game: This is where you choose the game type and map name.

Players: Lists all active players, including bots. Bots will not spawn unless there is at least one human player connected. This screen is also where you as the server admin can wield your power by kicking out or banning certain players. You can also set the minimum number of players from this screen.

Server Console: Simply a list of messages written to the server console. Includes things such as who connected, who disconnected, etc.

Mutators: This is where you choose what Mutators you want to run in your game. After you select your Mutators, be sure to click Restart Level to active them.

SPEEDING UP THE GAME

As great as *Unreal Tournament* is, it won't do a thing for you unless you have the proper hardware. The Unreal engine will push your machine harder than George Forman pushes sales of his Lean Mean Grilling Machine at Sears. The minimum specs we can recommend for playing *Unreal Tournament* are a 350MHz Pentium II with at least 64MB RAM and a Voodoo2 or higher video card. That's the system we used when writing this feature, and we squeaked by with an average framerate of 30fps in most of the maps.

BENCHMARKING

To find out how well *Unreal Tournament* performs on your machine, download www.psibre.co.uk/Phobia.zip and extract it to your UnrealTournament/System directory. Start the game up and choose Tools | Time Demo Statistics. Now go to the UT console by pressing ~ and type **demoplay Phobia**. Hit ESC twice and watch the demo play. You'll be able to see the onscreen framerate counter as the demo plays. When it's over (it'll take a few minutes), press ~ to go back to the console where the average FPS for the whole demo will be displayed.

TWEAKING

There are a few menu options that will help you get better framerates, but most of the graphic options are in the UnrealTournament.ini file. Let's look at the menu options first. Go to the Options | Preferences dialog and choose the Video tab. Uncheck Dynamic Light and Decals. These are huge framerate hogs and will net you your biggest gains. You can also set World Texture Detail and Skin Detail to low, but these are less of a factor on framerate than the previous two items. That's about all you can do through the menus.

Next, open up your UnrealTournament.ini file and look for the [GlideDrv.GlideRenderDevice] section. It should be pretty evident that to improve performance you should change anything that says "True" to "False" and anything that says "False" to "True". The two most important items here, however, are Translucency and VolumetricLighting. Make these False! You're not going to miss them, and it should result in pretty significant performance gains. Setting ShinySurfaces and Coronas will help, but less so.

It should also be noted that these kinds of graphic tweaks work best on faster CPU systems where the video card is the bottleneck. In slower systems, the CPU is struggling to keep the video card fed with geometry and lighting information, and thus the video card spends a significant amount of time sitting around waiting to process new information. If you have a 350MHz-400MHz system, you're better off leaving the graphic options at their default settings, because you're only going to notice a 2-3fps increase. You should never give up visual quality for a negligible improvement in performance. Users of faster systems, however, should see a greater difference in their benchmark scores. The ultimate judge is, of course, you. Tweak, look, benchmark, and then decide what tradeoffs you can–and are willing to–make.

TIP! Better players tend to prefer a higher level of mouse sensitivity. A high sensitivity allows you to cover more space with less hand movement when turning. Quick 180-degree turns and 360-degree "look arounds" in the heat of battle are much easier to pull off. If you're not used to a highly sensitive mouse, then you might want to gradually work your way up to higher sensitivity settings.

GIVING YOUR MAC THE BIRD

Long before Linux started picking up steam, there was another revolutionary operating system that was meant to change the world: Macintosh. Unfortunately—through a series of business blunders and just plain bad luck—Apple lost its chance to become the dominant player. And even though the most recent crop of G3- and G4-based Power Macintosh PCs pack a lot of power under their hoods, the same can't be said for the operating system that runs on top of all that raw iron.

The Mac OS is an elegant operating system—it just lacks raw power. While Apple has done an admirable job of keeping the Mac OS running well, adding new widgets and features along the way, the OS still has much of its code rooted in 1984—or before. It lacks the basic features of modern operating systems, such as preemptive multitasking and protected memory, and its networking support is just now coming up to par with the rest of the world. Apple plans to fix all of this with Mac OS X—ironically, based in part on BSD and the Mach microkernel—due at some point in 2000. But if you happen to own a Mac machine and just can't wait to start using a completely modern operating system, take heart. We have the scoop on all of the Linux-on-Apple distributions out there, and we'll show you how to get your gear ready to run the hottest new OS in town—all without losing the ability to run the good ol' Mac OS on a separate partition.

by David Reynolds

Photoshop magic by Gina Donley

WHAT YOU'LL NEED

To install Linux on your Mac, you'll need a few things:

- A hard drive for Linux
- A Linux distribution (either downloaded or on CD)
- A partitioning tool (such as *Drive Setup* or *FWB Hard Disk Toolkit*)

First Things First

Now that you've decided to take the Linux plunge (trust us—it's amazing!), it's time to make your first major decision: What Linux distribution should you use? Surprisingly, this is harder than you might think, since there are several distributions to choose from. The kind of Apple hardware you own may also narrow your choices a bit.

Because Apple has changed the main architecture of its motherboards three times during the life of the PowerPC chip, not all Linux PowerPC distributions will work on all Power Macs.

Worse yet, there are several Power Macintosh models that can't run Linux at all.

So, what's a penguin fan to do?

Well, if you have a PCI-based Power Macintosh, you have the most choices. In fact, you can run any of the five distributions listed in this very article! Off the cuff, we heartily recommend LinuxPPC, TurboLinux, or Yellow Dog Linux, because all three distributions are complete Linux implementations and include product support—not that you'll ever need support, right? Debian or MkLinux are a couple of other alternatives, but in our eyes aren't as mature and, in the case of MkLinux, may feel a bit slower because of its underlying architecture. Still, many of the Mac clones (Power Computing and Umax) can also run these distributions, so if you're hankering for something a little different, Debian and MkLinux may be tasty enough to whet your appetite.

If you have a NuBus-based Power Macintosh (61xx, 71xx, 81xx or Performa 61xx), then your only choice is MkLinux, which supports a huge range of PowerPC-based Macs. MkLinux and LinuxPPC are binary-compatible, so MkLinux users should have no trouble finding software to download. If you're running a 680x0-based Mac, your best bet is Debian's m68k distribution—which will let you bring Linux to your pre-PowerPC Mac. To run Linux on a 680x0-based Mac, your Mac will need a Paged Memory Management Unit (PMMU), which did not ship on the original 68000 processor. If your old Mac did support virtual memory under Mac OS, then it already has a PMMU. Phew!

Once you've decided which distribution you want to install, you'll have to decide which way you want to get it. Most are available either via FTP or a distribution CD. We recommend springing for the distribution CD so you'll always have the software at your fingertips. Besides, if you're still prone to using an analog modem, it'll take a looooooong time to download a complete distribution.

HINT: *If you do choose to download your distribution, put it on a main drive other than the one where you'll be installing Linux.*

HINT: *It is possible to do an install via FTP, but unless you have an always-on high-speed connection, you'll be much better off getting the distribution on a CD.*

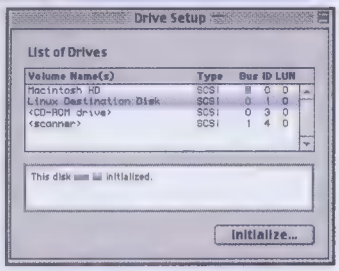
PREPARING THE HARD DRIVE

Once you've selected your distribution, it's time to dive in. The first step is preparing the hard drive for installation. Start with an empty hard drive, because you're going to have to change the drive partition map to do your install, and that means you'll lose all your data.

To do this, you'll need a hard drive partitioning utility. There are several out there–including *pdisk*, *FWB Hard Disk Toolkit*, and older versions of Apple's *Drive Setup*–but we'll be using the newest version of *Drive Setup 1.8.1* from Mac OS 9. Here's how to use *Drive Setup 1.8.1* to get your hard drive ready for Linux.

Step 1: Putting The Car In Gear

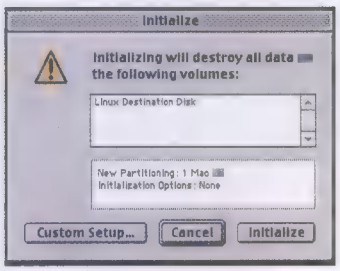
Boot from a volume other than the one where you plan to install Linux, and make sure that *Drive Setup 1.8.1* is on the boot volume. That can be the Mac OS 9 CD or another hard drive. Launch *Drive Setup 1.8.1*, and select the drive where you want Linux to be installed. Click on the Initialize button.



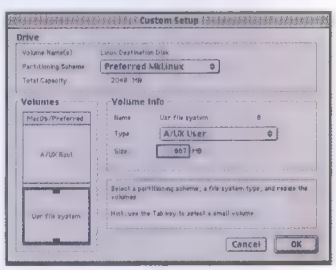
***Drive Setup 1.8.1* is a small utility, but it packs the power to prepare your hard drive to use two OSes.**

Step 2: Customizing The Details

In the Initialize dialog box that pops up, click on Custom Setup.... In the Custom Setup... dialog box, choose Preferred MkLinux in the Partitioning Scheme: popup menu. (You can also create the partitions manually, if you want.) Select the MacOS/Preferred partition, give it a size of 200MB (you shouldn't need any more), and make sure that Mac OS Standard is selected in the Type: popup menu. Use the Tab key to select the next partition, which will be the root partition. Make this one nice and meaty–around 900MB or so–depending on the size of your hard drive. Tab to the Swap partition and make sure it's over 50MB but under 128MB. There's a lot of ongoing debate about just how big you should make your swap space, but something in that range should do just fine. Finally, tab to the Usr file system partition and resize the bottom of the partition block to fill the rest of the hard drive. Click OK to go back to the Initialize dialog box. (There are many partitioning schemes, so feel free to choose the one you want, if this one doesn't suit you.)



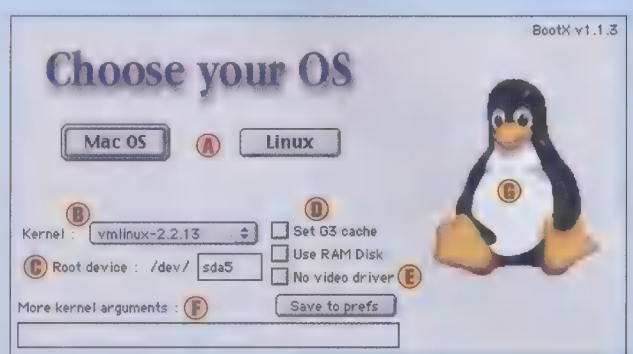
Before you initialize your disk, you'll need to click on Custom Setup... to tell Drive Setup what kind of partitions you want to create.



***Drive Setup* has several pre-configured partition schemes, but we liked the Preferred MkLinux scheme the best.**

ALL ABOUT BOOTX

BootX, by Benjamin Herrenschmidt, keeps Mac users from having to fiddle about in Open Firmware to boot Mac OS. Here's a closer look at the utility:



A: These buttons determine which OS will boot–Mac OS or Linux.

B: This popup menu lets you select different kernels when booting Linux.

C: This text box lets you select which device and partition holds the root.

D: These three checkboxes let you control whether the G3 cache is enabled, whether *BootX* looks for a RAM disk, and whether a video driver is loaded or not. If you're having trouble booting, you may want to change these settings.

E: This button lets you save these preferences.

F: This text box lets you pass arguments to the kernel. It's rarely used.

G: This is a penguin. They're flightless birds that eat a lot of fish. Yum.

Step 3: Initialization Process

Click on the Initialize button. After a bit of thinking, your Mac should come back to tell you that the initialization was successful. Yes! Next, install the Mac OS on the Mac partition of your Linux hard drive. Although 200MB should be enough space to install a complete version of the Mac OS, you probably won't need it–after all, the whole point of this is to run Linux, right? So when installing Mac OS, use a custom install to install only the components you really need.

Finally—It's Time to Install!

The hard drive's all set–now it's time to actually install Linux. The details vary from distribution to distribution, but all of the distributions have explicit installation instructions that are pretty easy to follow. Most of them use the Red Hat installer, which, even though it may not win the Miss America Beauty Pageant, is pretty easy to follow. You should have all of your Internet settings before you begin, as you'll need to enter IP settings as you go along.

In general, though, the installation goes something like this. After getting the necessary files set up on your Mac OS partition

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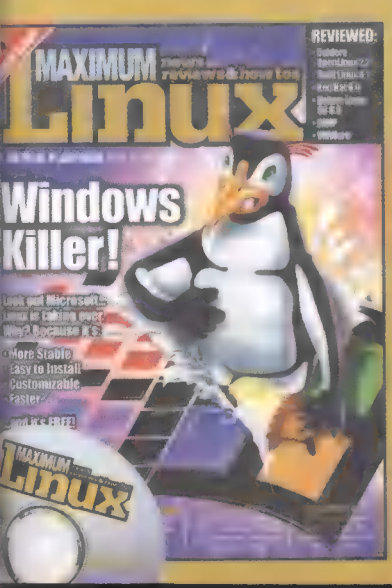

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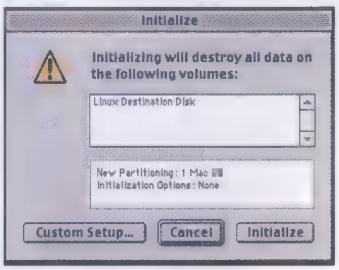
PREPARING THE HARD DRIVE

Once you've selected your distribution, it's time to dive in. The first step is preparing the hard drive for installation. Start with an empty hard drive, because you're going to have to change the drive partition map to do your install, and that means you'll lose all your data.

To do this, you'll need a hard drive partitioning utility. There are several out there–including *pdisk*, *FWB Hard Disk Toolkit*, and older versions of Apple's *Drive Setup*–but we'll be using the newest version of *Drive Setup 1.8.1* from Mac OS 9. Here's how to use *Drive Setup 1.8.1* to get your hard drive ready for Linux.

(You can also create the partitions manually, if you want.) Select the MacOS/Preferred partition, give it a size of 200MB (you shouldn't need any more), and make sure that Mac OS Standard is selected in the Type: popup menu. Use the Tab key to select



Before you initialize your disk, you'll need to click on Custom Setup... to tell Drive Setup what

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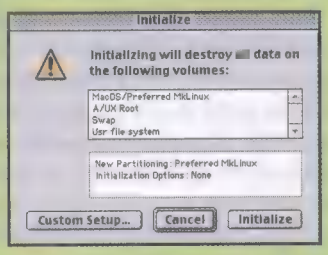
Step 3: Initialization Process

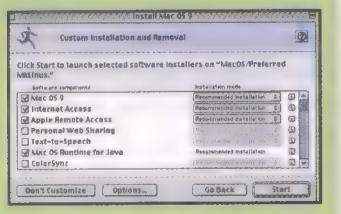
Click on the Initialize button. After a bit of thinking, your Mac should come back to tell you that the initialization was successful. Yes! Next, install the Mac OS on the Mac partition of your Linux hard drive. Although 200MB should be enough space to install a complete version of the Mac OS, you probably won't need it–after all, the whole point of this is to run Linux, right? So when installing Mac OS, use a custom install to install only the components you really need.

Question of the Day

Do you really need a Mac OS partition? Although there are ways around it, the most convenient way to have Linux on a Mac is by using a utility called *BootX* (available from http://calvaweb.calva-com.fr/bh40/), and that requires a Mac OS partition with a valid System Folder. *BootX* is a Control Panel that loads during startup, letting you choose between Mac OS or Linux. *BootX* can also be launched while running Mac OS. For more on *BootX*, see the aptly-named All About *BootX* sidebar on the opposite page.



Just click on Initialize to get your hard drive all primed and pumped for Linux.



Choose only the packages you'll need for your Mac OS partition–you'll want all the space you can get for your Linux install.

Finally—It's Time to Install!

The hard drive's all set–now it's time to actually install Linux. The details vary from distribution to distribution, but all of the distributions have explicit installation instructions that are pretty easy to follow. Most of them use the Red Hat installer, which, even though it may not win the Miss America Beauty Pageant, is pretty easy to follow. You should have all of your Internet settings before you begin, as you'll need to enter IP settings as you go along.

In general, though, the installation goes something like this. After getting the necessary files set up on your Mac OS partition (typically a copy of the Linux kernel, either *BootX* or *BootVars* to change Open Firmware, and the base packages for installation), it's merely a matter of restarting after configuring *BootX* according to the installation directions. Soon, you'll be in the Red Hat installer, which merely uses keyboard commands. While running through the Red Hat installer, you'll be asked where you'll be installing Linux from, what your TCP/IP settings are, and what keyboard layout you'll be using. You'll also be asked which partitions you want to use as root, swap, and usr partitions–the same partitions you set up earlier. Take note of how the root partition is named–you'll need to enter this into the Root device: text box in *BootX*. Finally, you'll also be asked what packages you want to install. Select a generous portion of these if you have ample hard drive space. Once you begin installing these packages, the Red Hat installer will take a while to finish. You'll be asked a few final questions, and then it's time to reboot.

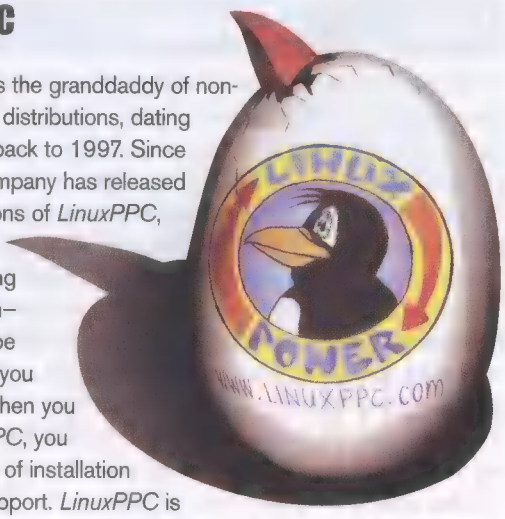
BootX will pop up after a short "Welcome to Mac OS" screen. Check your *BootX* settings to make sure they match what the instructions say they should (typically, you'll have all of the checkboxes off, no kernel argument, and the location of your root partition), and bravely click the Linux button. If everything went well, you should see your login screen pop up after a bunch of text flies by, or, if your Linux distribution has been configured to launch X on startup, you'll get an X login window. Congratulations! You've done it!

HOT TIP!

It may not be the Oracle at Delphi, but the Linux on PowerPC FAQ-O-Matic (located at www.dartmouth.edu/~jonh/lppc-serve/cache/1.html) will answer most of your pressing PowerPC Linux questions. Take the time to stop by. It's well worth the time you'll spend browsing for answers to your most pressing Linux-on-Apple questions. Be sure to click on the Start Here! link near the top of the page–it's chock full of nutrients and other good information.

DISTRIBUTION LOWDOWN

LinuxPPC



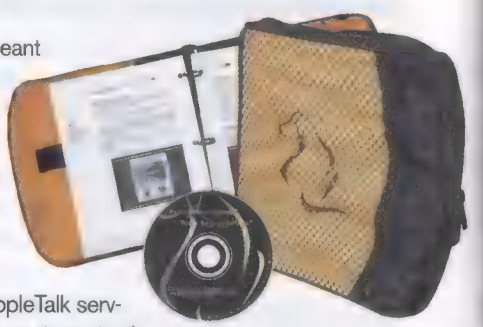
LinuxPPC is the granddaddy of non-Apple Linux distributions, dating all the way back to 1997. Since then the company has released seven versions of *LinuxPPC*, and is currently working on an eighth—which may be available as you read this. When you buy *LinuxPPC*, you get 30 days of installation technical support. *LinuxPPC* is built on recent versions of the 2.2.x kernel, and the two-CD set features a plethora of applications, including Apache 1.3.6, a ton of network applications, games, and several X Window implementations (including AfterStep, Enlightenment, and KDE).

LinuxPPC feels like it's aimed a bit more at the consumer (despite its inclusion of great networking applications), and its installer speaks to that. Using a compressed file system, *LinuxPPC* has a mouse-driven installer that makes installation much more Mac-like. For those of you who prefer such things, though, the Red Hat installer is still there. LinuxPPC supports a very wide range of hardware.

LinuxPPC and IBM announced a deal a few months ago to develop non-Apple PowerPC-based hardware. As a result, you may find PowerPC-based hardware that runs Linux as its primary OS—no Mac OS needed.

PRODUCT: LinuxPPC
URL: www.linuxppc.com
PRICE: $32
AVAILABLE FOR DOWNLOAD: Yes
SUPPORTED HARDWARE: PCI-based Power Macintoshes (4400, 5400, 5500, 6360, 6400, 6500, 7200, 7300, 7500, 7600, 8500, 8600, 9500, 9600); 20th Anniversary Macintosh; some Performas (6360, 64xx, 65xx); G3 desktops; G4 desktops; iMacs (except iMac DV); PowerBooks (2400, 3400c, all G3s); iBook; most Motorola, Power Computing (except Power 100 and Power 120), and Umax clones; PREP- and CHRP-based machines.

Yellow Dog Linux



Yellow Dog Linux is meant to be used as an Internet/Intranet server, and it ships complete with the applications to do the job—Apache 1.3.x, the BIND name server, Netatalk (to provide AppleTalk services), and four (yes, count them, four) databases (MiniSQL, MySQL, PostgreSQL, and FrontBase).

The distribution CD for *Champion Server* is $24.95, but Yellow Dog Linux offers several additional options. For a little more cash, you can get either Web-based or live technical support and a nifty binder to hold the CDs. Still, at just $24.95, the *Yellow Dog Champion Server CD* set is one of the cheapest distributions out there, and it works very well. Like the other distributions, *Yellow Dog Linux* uses the Red Hat Package Management system for installations. As we went to press, Yellow Dog was gearing up for the release of *Champion Server 1.2*, slated for release during the first quarter.

Yellow Dog is currently developing a Linux version for the home user, called, wittily enough, *Gone Home*. This home distribution is slated to include games and home office applications, and will feature a graphical installer—hopefully a step above the Red Hat installer. It, too, is expected to become available in the first quarter.

PRODUCT: Yellow Dog Linux
URL: www.yellowdoglinux.com
PRICE: Distribution CD: $24.95 for one installation and one source CD
AVAILABLE FOR DOWNLOAD: No
SUPPORTED HARDWARE: PCI-based Power Macintoshes (7200, 7300, 7500, 7600, 8500, 8600, 9500, 9600); some iMacs; some Performas (4400, 5400, 5500, 6400, 6500), G3 desktops; "Yikes" G4 desktops; iMacs; 1999 PowerBook G3 Series; PREP- and CHRP-based machines. Not officially supported (but should work just fine): iBooks; DVD iMacs; higher-speed G4s; PowerBook 2400 and 3400; 20th Anniversary Macintosh; most Motorola, Power Computing, and Umax clones; PowerPC-based BeBoxes; PREP- and CHRP-based machines

I installed LinuxPPC on my PowerBook G3 266. However, I found the OS to be a big pain in the ass. It took me hours trying to figure out how to get basic things, like my CD player to work. I never could get a PPP connection using my modem, nor could I use my Zip disk to work.

—Jason Chilvers

LinuxPPC is all about them. Once you remove Win95 from your Beige Powermac and replace it with MacLinux, you have a fast and friendly place to get work done. LinuxPPC is still a work in progress.

—Will Henderson

MkLinux

MkLinux has a long and storied history, tracing its roots back to Apple itself, where this flavor of Linux first got its start. Apple spun off the *MkLinux* project to a community-led effort to concentrate on its own open source effort code-named Darwin (a BSD clone). *MkLinux* is a version of Linux hosted on the Mach microkernel, which gives *MkLinux* a unique flavor. On the plus side, multiple operating systems can run at the same time on top of Mach, which is how Apple's "Blue Box" Mac OS compatibility layer works in Mac OS X Server (and will, presumably, work in Mac OS X). On the minus side, *MkLinux* feels slower than other Linux distributions because of the messaging that has to go on between the Linux kernel and the Mach microkernel. Kernel development can also be more difficult because of the way that the Linux kernel is hosted on Mach.

MkLinux supports a wide range of hardware, and is the only Linux distribution that will run on older NuBus-based Power Macs. Unfortunately, most of the more recent Macs released (the blue-and-white G3s, the G4s, iMacs, and iBooks) are unsupported. Work is progressing on iMac support—after all, the current *MkLinux* release is Developer Release 3. The full non-developer Release 1 is on its way.

PRODUCT: MkLinux
URL: www.mklinux.org
PRICE: $20 from PrimeTime Freeware (http://www.ptf.com); CD and 360-page reference book available for $50
AVAILABLE FOR DOWNLOAD: Yes
SUPPORTED HARDWARE: NuBus and PCI-based Power Macintoshes from the 6100 to the Beige G3 desktop; many PowerBooks (1400, 5300, 2400, 3400, G3); most Motorola, Power Computing, Umax, Radius, and DayStar clones.

Debian

Debian Linux comes in two flavors: PCI-based PowerPC Macs and 680x0-based Macs. This makes *Debian Linux* the only major Linux distribution that can run on the older 680x0-based machines, and if you're looking for a cheap Web server, it's hard to do worse than a 680x0-based Mac running *Debian Linux*. The current version available for download is built on the 2.2.x kernel, and the distribution has numerous applications available for download.

Debian is also currently developing a PowerPC version of *Debian Linux*. Unfortunately, the PowerPC version isn't quite ready for distribution (at press time it was 90 percent complete), but it is available for download if you want to check it out now. If you need support for *Debian Linux*, you'll have to get it via the usual free sources—newsgroups, mailing lists, and IRC. Installing *Debian Linux* is made to sound difficult when reading the Debian Web site, but it's not so bad (trust us!) when you really get into it.

PRODUCT: Debian
URL: www.debian.org
PRICE: N/A (Distribution CD not yet available)
AVAILABLE FOR DOWNLOAD: Yes
SUPPORTED HARDWARE: Anything that can run the Linux kernel and the GNU tool sets (how's that for nice and obscure?). This includes the iMac; iBook; some Power Macintoshes (4400, 5400, 5500, 6360, 6400, 6500, 7200, 7300, 7500, 7600, 8500, 8600, 9500, 9600); G3 desktops; G4 desktops; some Performas (6360, 64xx, 65xx); some PowerBooks (2400c, 3400c, G3); and CHRP-based machines. Debian may run on most Motorola, Power Computing, and Umax clones too.

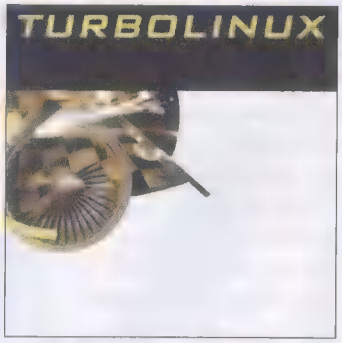
[illegible] time in the [illegible] system is [illegible]

–Dave Camp

[illegible] other formats [illegible]

–Kent Smith

TurboLinux PPC



One of the largest worldwide Linux vendors (the company enjoys huge market share in Asia), TurboLinux also has a PowerPC version of its operating system available. *TurboLinux* is based on the 2.2.x Linux kernel, and it ships with a solid core of applications (including *Gimp* and *Apache 1.3.3*, of course) and support for AppleTalk networks. It uses the same *BootX* control panel as other Linux distributions to add dual-boot capabilities. And, although it's not a Red Hat port, it does use the Red Hat Package Management to do installations. *TurboLinux* also ships with TurboDesk, a GUI that should feel familiar to Mac users.

TurboLinux runs on most PCI-based Power Macintoshes, from the 7200 to the beige G3s. Older, NuBus-based Macs aren't supported, and the newer blue-and-white G3s (and ultra-new G4s) aren't either, although TurboLinux promises that support for these new machines will be added via a downloadable kernel update (a new version should be available by the time you read this). If you own a NuBus-based Power Macintosh, *TurboLinux* includes a version of *MkLinux* on its reference CD, although the company doesn't officially support it.

PRODUCT: TurboLinux
URL: www.turbolinux.com/ppc
PRICE: $49.95
AVAILABLE FOR DOWNLOAD: Yes
SUPPORTED HARDWARE: PCI-based Power Macintoshes (7200, 7300, 7500, 7600, 8500, 8600, 9500, 9600); Beige G3 desktops; some iMacs; and some PowerBooks.

LINKS TO HELPFUL MAC LINUX SITES

If you're looking for some helpful Mac-related Linux sites, here's a short list:

- **LinuxMac (http://www.macnews.de/_linuxmac/)**
- **Powermac/Linux (http://www.cs.wisc.edu/~tesch/linux_info/)**
- **LinuxPPC for Motorola StarMax (http://www.duke.edu/~wj/linux/)**
- **Mach Linux (http://mach-linux.org/)**
- **MkLinux mailing list archive (http://ibmbb2.aug.ipp-garching.mpg.de:8001/dpc/public/)**

FIVE FANTASTIC FAQS

Q: How do I get files between a Mac volume and a Linux volume?
A: There are a couple of utilities that will let you mount Linux volumes while using Mac OS (notably MountX and LinuxDisks), but reports say that their underlying code is buggy and may cause damage to the Linux volume. So, if you want to move files between your Linux volume and your Mac OS volume, try using the mount command to mount your Mac OS volume under Linux. Such disks are typically mounted read-only, so the data transfer is one-way, and mount currently works only on HFS volumes, not HFS+ volumes–which is why we had you prepare your Mac OS volume as an HFS volume in the first place.

Q: Can I install Linux on a Mac while using a G3 upgrade card?
A: Although G3 upgrades are pretty transparent, some require more hacking than others. If the G3 is on a daughtercard or in a ZIF socket, Linux will probably install. If it's in a cache slot or processor direct slot, you may run into some problems. If your G3 upgrade card requires an extension to run and you have trouble with Linux, try renaming your extensions so that your G3 upgrade extension loads first and BootX loads after it.

Q: Can I run Mac OS applications while using Linux?
A: Since you're using Apple hardware to run Linux, you can use one of two utilities to run Mac OS applications while running Linux. Sheepshaver (http://www.sheepshaver.com) is a commercial utility ($50) originally developed for BeOS. The Mac-on-Linux project (http://www.ibrium.se/linux/mac_on_linux.html) is a GNU Public License way of running Mac OS apps while running Linux. Neither is finished yet, but you can download the latest version of Mac-on-Linux from the Web site.

Q: How much RAM/hard drive space do I need to use Linux on Mac?
A: In most cases, you can get by with 16MB of RAM and a couple hundred MB of hard drive space, but to do useful work, you should have at least 32MB of RAM and a 1GB hard drive. More is better, in these cases, and it wouldn't hurt a bit to have 64MB of RAM and a couple of gigabytes of hard drive space.

Q: Can I use Linux software for Intel while using Linux on Mac?
A: Not directly. Although *MkLinux* and *LinuxPPC* are binary-compatible, the same can't be said for Intel Linux software. If source code is available, most things will compile under a Mac version of Linux with little trouble.

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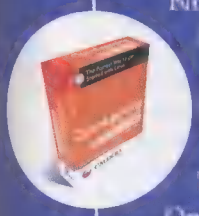

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Where, Oh Where Has My CD-ROM Gone?

I've installed Caldera's *Open Linux 2.2* on a 233MHz Pentium with a 3GB hard drive and a Windows partition. The install went fairly well compared to *Red Hat* and *Mandrake* (which I could not get to work at all), but my problem is getting *Open Linux 2.2* to mount my CD-ROM and read and write to my Iomega ZIP CD. I've read the manual which comes with the disk and cannot make any headway. I've also gone online(through Windows) to the online docs. I've got all the icons for mounting and unmounting all I want, but I keep getting a "KFM" error message saying that it can't find "FILE:/AUTO/CDROM" or I do not have permission to use or read. I've installed the OS four times and each time nothing works the way it should. What am I doing wrong?

William E. Keller

Well, William, there's a good reason why you don't know where /auto is. That's because it doesn't exist. Something tells me you're trying to use KDE to mount the drives. To solve this problem, the first thing we have to do is gather a little information. First of all, which is which? If your CD-ROM is secondary master, then it's /dev/hdc. Setting your ZipCD as secondary slave would make it /dev/hdd. Drop to the command prompt to fix this problem—either exit out of X, or open an X terminal. From here, we have one more question to answer: Are you planning on using your CD-RW in Linux? If so, then we're gonna have to recompile your kernel with the appropriate support. Under "Block devices," take out all support for IDE CD-ROMs, then enable scsi emulation. Next, go down to "SCSI Support," and enable SCSI CD-ROM support and SCSI generic support. Make any other changes you wish, then compile your kernel and install it. Now, your secondary master is /dev/sr0 and your secondary slave is /dev/sr1. Now we're ready to fix your CD-ROM mounting problems. Reboot on your new kernel is active, then open an Xterm. You should already have a directory called "/cdrom" in your filesystem, but you need to make another one called "/cd-rw." Now, open /etc/fstab with your favorite text editor, and add the following line:

```
mount  -t auto /dev/sr0 /cdrom
```

That should automatically mount your CD-ROM if there's a disc in the drive. If you ever want to mount it manually, just type that in at the command line, or make yourself a small shell script to do it for you. Typically, mounting the CD-RW isn't necessary, as the CD writing software available for Linux (we recommend *xcdroast*) uses raw access to the device. Just do all that, and you should be flying high!

What Was My Password Again?

I installed *Red Hat* a few months ago and have forgotten the root password. How can I get back in?

Ian Shaffer

There are several ways to go about this, Ian. One of the most popular is the tabled Linux "single user mode," which exists in almost all forms of UNIX. This would dump you straight into a root shell, and allow you to change the password. When you get your Lilo prompt, type Linux single to boot the system in single user mode. If it doesn't work, then you can always give it the three-finger salute to restart the system. If single user doesn't do it for you, then you should hold on the *Red Hat* rescue floppy, and when you get it running, type passwd to change the password. Then you can reboot the system and login normally.

Network Problems

I am setting up a Linux box to perform the function of a firewall, proxy, and game server. My first step is the firewall and proxy. I am using 3com 3C905 NIC cards, and I am unable to find drivers for these cards. The 3com site does not seem to have them online. Where can I get these drivers? Also, do you have any hints on how to map and install dual LAN cards? I am using the distribution that came with the magazine.

Please remember that I am one of the unfortunates stuck in the Windows world, and I am trying to expand my knowledge of working, non-crashing technologies.

Darcy Pelland

Your answer lies in the wonderful world of loadable kernel modules. The simplest way to do this would be to look in /lib/modules/<kernel version>/net, and find the 3c509.o module. If it doesn't exist, you may have to compile it from the source first. Once you've located it, run modprobe 3c509.o as root. This should dynamically load support for that card. You can make it permanent in two ways. You can recompile your kernel with support for the card built in, not modularized, or you can look through your /etc/rc.d directory for the init script that loads modules and add support there. Either way is fine, and your ethernet cards should work fine. As far as loading dual LAN cards, you can do that the same way, but you will need to specify more than one Ethernet card of the same type in the boot options. In /etc/etc/lilo.cnf, add

append= "ether=0,0,eth0 ether=0,0,eth1".

From there, you should be flying high on the great road of networking! Salut!

To Partition, Or Not to Partition?

I can't install *Mandrake* from the CD until I make a partition. I have cleared 850MBs on my notebook, but I have no idea how to use *DiskDruid*. Where can I get a clue? I just need help with the partition.

Marvin Russell

Oy... 850MB is a baby in the world of Linux, but you're going to have to make a swap partition of about 120MB, too. The space that you cleared can't just be free space in your Windows partition–it has to be free space that isn't taken in a partition. In other words, if the space still resides in the Windows partition, you're going to have to use a third-party partitioning tool such as PowerQuest's *Partition Magic*. After you've done that, try using Linux's fdisk to do the partitioning instead of *DiskDruid*–many people find it easier to use. Make sure you create two partitions: your root Linux partition, and a 120MB partition (or you can easily get away with 64MBs) to be used as swap space. After you've created the partitions, press t to toggle the partition type. Toggle the type on your newly created swap partition to type 82, which is for the Linux Swap file. After you've done that, press w to write the partition table and exit. Now you're ready to begin your install!

Kernel Problems

I'm an owner of an old Pentium 133MHz PC. I have Linux on my computer, but I wanted to squeeze more performance out of the box. I've read the article about compiling and configuring your own kernel, and I tried it. The only problem is that after using the "make config," "make depend; make clean" script, I cannot compile bzImage. It gave me a bunch of errors that I don't understand (I'm green and not a programmer!), including something about "Error 1." Huh?

Also, is it possible to have a Winmodem on an ISA port? My modem

Got a problem with your Linux box? Never fear, the Penguin's here, and he's ready to answer your most pressing Linux questions. From networking to kernel hacks, this is your one-stop shop for tech talk.

won't work with Linux, no matter what I try. Thanks for helping!

Benton Lam

Let me answer your question about the modem first. It is not possible to use a winmodem in a Linux box–they depend on a closed-source Windows DLL. If you're unsure what sort of modem you have installed in your machine, take a look on the manufacturer's Website for the make and model, and if it is a winmodem, I'd look into buying a new modem.

On the question of the kernel compile, it's really hard for us to help you with this problem without a specific readout of the errors involved. Those errors aren't just gibberish, they're your compiler telling you that there is a problem. We can suggest you ensure that you are logged in as root when you try to compile the kernel. Only root has permissions to access many of the files that are needed to compile the kernel, so if you were logged in as a user when you tried the compile, then you would receive errors. It sounds like you might have an incomplete "Dev" install. Check the paths, and try re-installing the libraries and kernel source.

Boot! Boot!

What's the procedure for an unbootable Linux partition? I've installed *Red Hat 6.1* at least ten times, trying different things with *Partition Magic*, and I don't understand what's wrong. It will only boot if it puts LILO on the master boot record. Right now, I have Win98 and Win2000 on separate partitions, and *boot magic* runs either one just fine. What I can do to make it boot Linux? I don't want to use LILO's menu–I like *boot magic* way too much.

Mmsmith508

This is a simple matter of booting up your Linux partition, with a boot disk if necessary, and logging in as root. Once you've logged in, run *fdisk*. There is a hotkey in the Linux fdisk menu to toggle the bootable flag on the partition. Toggle your root partition to bootable, press w to write the partition table and exit, then load lilo into the first superblock of the root partition. This should fix your problem and have you triple booting like you want. Have fun!

Blue Screen of Death

I recently installed Caldera System's *Open Linux 2.3* on my notebook. I finished the installation and installed *boot magic*. When I booted into Linux, I got to the login screen and logged in. After that, unfortunately, the background was replaced with a blue screen, and my pointer turned into an "x." The hard drive was still active and was doing something, but nothing showed up on the screen. Please help!

Brian W.

It sounds like your system is booting straight into X (usually runlevel 5), and your X server is either not configured properly, or X doesn't have support for this card. If you're certain that your video card is supported, then re-run setup and try to configure X a little more conservatively. If you don't know for sure, then check out the following URL: http://www.xfree86.org/cardlist.html to see if your card is supported. If not, then you might try a beta release of X. You might be able to log into your system as it is by pressing CTRL+ALT+BACKSPACE when you get that "x" for a pointer. This is a hotkey kill sequence for X, and should drop you to a console. From that point, you should be able to run Xconfigurator to fix your problem.

DVD Dilemma

I would really like to abandon Windows further by being able to read my DVDs (and play the movies, of course) in Linux. However, I can't find any DVD drivers/players on the Net. I'm experienced in hardware and Windows, however, I'm still a newbie when it comes to Linux. I'm running both Caldera OpenLinux 2.3 and Red Hat 6.0.

Roger Mingorance

I hate to be the one to break it to ya, but as of right now, the Motion Picture Association of America (MPAA) has put a halt to people developing anything to read DVD format in an Open Source environment. They're claiming that it's a way to reverse-engineer their already weak CSS encryption algorithm. The only available choice would be DeCSS, which, at press time, was pulled from many Web sites. Still, check out: www.pzcommunications.com/decss/where.htm in case you can still download the code. Special kudos go to Creative Labs for Open Sourcing the drivers for its dxr2 decoder cards, which is now available at http://opensource.creative.com.

Ice Board

I am trying to install the Mandrake distribution that came with your mag. The installation program runs until it gets to the mouse-probing routine. It discovers my PS/2 mouse, but then the keyboard is frozen, and I can't press enter to continue, no matter how much I try. I am using the workstation install option, and my equipment is a Pentium 133MHz with 32MB RAM, S3 Video, a Realtek NIC, and no sound. I am using a boot floppy to start the install, Any ideas? Is there any way to bypass the alien mouse probe and manually assimilate the mouse later?

Bill Kanta

Bill, this is quite the unusual problem. Telling the system that you don't have a mouse and then going back and manually loading gpm would do it, although I can't understand why the mouse would be causing the system to lock up like that in the first place. Try disabling the mouse in the system's BIOS (if it is possible on your machine), then install Linux, reboot, enable the mouse in BIOS, then log in as root and type gpm -m /dev/psaux -t ps2. That should enable your mouse properly. It sounds like the install is probing the COM ports for a mouse, and it's finding something that the kernel doesn't like. Try the above and let us know if it works.

Sounds of Silence

I am very new to Linux. I own *Red Hat 5.2*, *Mandrake 6.0*, and (heh heh) *6.5 Deluxe*. Sound card support is offered for the Sound Blaster 16 and the Sound Blaster AWE 64, but not for the Sound Blaster Live Value edition. I then bought *Mandrake 6.5* and it installed easily, even recognizing that my system has a SB Live Value card (cool). However, the next pop up message I received was:

"Sound Card not supported."

I thought I had a pretty high end sound card. Should I just junk the card?

Todd Ames

You're in luck, Todd! Creative recently created a set of Open Source drivers for the SB Live! card. Proceed with your installation normally, and then go to:

http://www.creative.com/support/files/download.asp

.

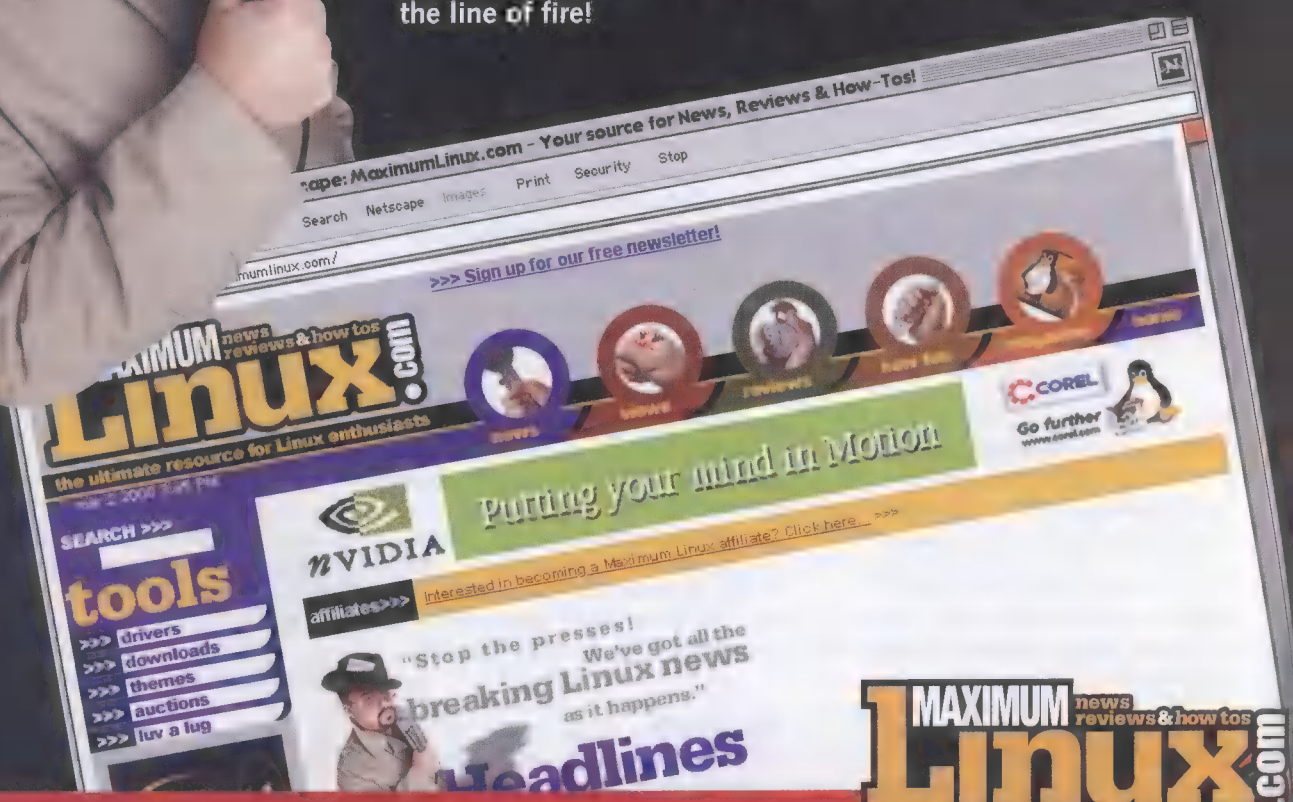
Now, select "Beta" files, your sound card, and region. Here's where you'll find your Linux drivers. Uncompress the archive, and read the installation instructions thoroughly. This should get you up and running with sound without a problem.

Got a tech problem? E-mail: askthepenguin@maximumlinux.com. Due to the volume of e-mails received, the penguin cannot personally respond to every letter.

Stop the presses!

Linux Declares WAR!

As Linux opens fire on the evil empire and their bloated operating system, MAXIMUMLINUX.COM is there! With breaking news from the frontlines of the OS wars, we'll send our brave correspondents directly into the line of fire!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Unleashing the Power of Linux

Being prepared is always a good thing. The Boy Scouts live by this motto, and if you're new to Linux or haven't dabbled with it enough to call yourself a Linux guru, you should, too.

When I first installed Linux, so many moons ago, I really had no idea what I was doing. Running Windows had always been easy. But even though it was ready to take me wherever I wanted to go, it was about as reliable as a rusty, old jalopy. When I finally decided to take the plunge, I quickly realized that running a different operating system wasn't as easy as I had expected.

Of course, I had only myself to blame. I had thought about Linux for years, talked about it for months, but never really did any research—real honest-to-goodness research—into the matter. But one blustery afternoon in early 1998—February 15th to be exact—I ran out to my local computer store and picked up a copy of *Red Hat 5.0*. I thought I'd get home, install the OS, and still have time to surf the Net before dinner. So, after a short walk home, I quickly opened up the box, plopped one of the CDs into the drive, and made a boot disk. I briefly flipped through the manual, but hey, I was in a rush, and reading all about this new OS seemed a boring thing to do.

I was lazy. That was my mistake.

After a few days of puttering along with an OS that I didn't know beans about, I became increasingly frustrated. Finally, I went to a Linux users group and asked for help. I asked a UNIX system administrator friend of mine for *more* help. It was like a baby learning how to walk.

If there's one piece of advice I can give you, it's this: If you're installing Linux for the first time, read the manual or book that ships with your distribution. It may seem boring—hell, it probably will be—but everything will fall into place soon enough.

And don't be afraid. Last time I checked, PCs don't bite, and yours should be no exception. If you're already running Windows on your PC, go into the Control Panel and open up the System folder. Write down or print out a list of all of your hardware—detailed and useful information you may have taken for granted in the Windows world.

I know that installing Linux for the first time can be scary—really scary—especially if you're doing it alone. Try keeping a little notebook. Having a diary written in your own words, culled from your own experiences, can be a great resource later on. Write down anything you don't fully understand and then look it up in the index of the manual that shipped with your distribution. Every time you do something for the first time, you should write it down for later reference.

If you're really unhappy with your first install, do it again. If you've written down the things that caused you problems, the second attempt should fly by. Redoing an install is most definitely *not* a waste of time. You'll learn something new each time, not just about installs, but about the way Linux runs in general, and the mindset of the operating system itself.

Hardware compatibility is also a major concern. Some of the newest hardware is supported by Linux; others aren't. Many people like to "test the waters" with an old machine. Advances in computer technology move so rapidly that almost everyone thinks they have a machine that has become outdated and should be relegated to the trash heap. This isn't necessarily true. If you've been trying to keep up with the Joneses, then you probably have a spare machine sitting around waiting for some cool Linux experiments. Although the age of the hardware doesn't matter—almost anything from a 486 and up will do—it's always best to check for incompatibilities before attempting an install.

One of the coolest sites for finding out if your hardware is compatible is the Linux Hardware Database. It'd be virtually impossible for any one place to be the complete repository for every piece of hardware ever invented, but this one comes close. Do some research. There are lots of sites out there where you can find such information. Fire up your favorite search engine and see what comes up.

If you can't find your hardware listed anywhere, you could try contacting the manufacturer of the item in question. If you find out that your hardware won't work, it's a good idea to send a polite e-mail to the company, requesting that they make it easier on the Linux community to write the code to make support possible. Be polite. A loud-mouthed Linux fanatic will do nothing to help the Linux cause. Every voice counts, especially yours, and companies sometimes need a little reminder that more and more people are switching to Linux daily.

Since my beginnings in Linux, the number of Web sites devoted to the subject has grown exponentially. Who knows? I may even put one up myself one of these days. But if you have the means and the slightest inclination to do so, post your experiences somewhere. Anywhere. It could be your own site, your local users group's site, or maybe just a mailing list, but remember: Anything you discover will help others down the line.

That's the way Linux works. It evolves through sharing, giving others the inspiration and encouragement to do it themselves.

Here are a few of my favorite sites. I'm sure you will find dozens of your own. If you do, let us know. That's what we're here for!

The Linux Documentation Project
http://metalab.unc.edu/mdw/index.html

Links for Linux
http://www.linux.org/links/

The Linux Installation HOWTO
http://www.linuxdoc.org/HOWTO/Install-HOWTO.html

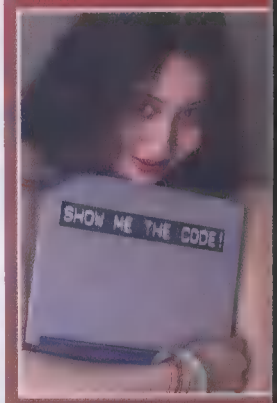
Linux Start's "Complete Newbie Tour"
http://www.linuxstart.com/newbie/

FixUNIX (much more fun than fixmkr)
http://www.fixlinux.com/

Linux Help Online
http://www.linuxhelp.org/

Everything Linux
http://www.[illegible].org/linux/everything.html

Linux [illegible] Database
http://[illegible]



Mae Ling is a Linux [illegible] who vows never to go [illegible] moments [illegible] the cause. If you [illegible] a comment about this column or have a [illegible] for a future topic, [illegible] send an e-mail to: maeling@[illegible]

LOVE A LUG

A guide to Linux user groups

Carl Constantine explains how to become one with the Linux community

If you believe what you read in the papers, Linux users must have highly advanced computer skills. Not so, Grasshopper! Linux is people-friendly and for real people who use it for various applications, at home and at work.

Some Linux fans use it at home as their primary operating system, and many run Linux alongside another system, such as Windows or the Mac OS, in a "dual boot" installation to ensure compatibility with the OS used at work.

Admittedly, Linux takes a while to learn, but familiarity breeds respect. With the able assistance of graphical interfaces for Linux such as GNOME and KDE, the transition to Linux is more gain than pain. Use it and watch your Linux comfort zone expand to places you didn't know existed.

Ah, Grasshopper, you seek to learn more about Linux? You hold the source of wisdom in your hands. Put on your new Penguin T-shirt and seek others of the Penguin persuasion at your local Linux User Group, or LUG, as the ancients say. These are the perfect spots to meet like-minded individuals of all ages and interests, and, yes, computer skill levels. Feel free to just hang around and soak up the tips and tricks, if that's all you want. Membership isn't mandatory of course, but it is highly recommended.

If you'd like to see your LUG listed here, send your LUG's details to lug@maximumlinux.com. You can also view our expanded LUG listings online at www.maximumlinux.com.

ALABAMA

Central Alabama Linux Users
http://www.dpo.uab.edu/~mbolding/
Linux Users of North Alabama
http://luna.huntsville.al.us/
South Alabama Linux User Group
http://www.salug.org/
West Alabama Linux User Group
http://www.walug.org/

ALASKA

http://www.aklug.org/

ARIZONA

Linux Users of Northern Arizona
http://www.flagstaff.az.us/LUNA
Phoenix Linux User Group
http://plug.phoenix.az.us

ARKANSAS

Little Rock Linux User Group
http://www2.arkansas.net/~bartlett5/lug.htm
Little Rock Linux User Group
http://www.lrlug.org/

CALIFORNIA

Silicon Valley Linux User Group
http://www.svlug.org
Linux User Group of Davis
http://www.lugod.org/
Cal Berkeley Linux User Group
http://www-callug.cs.berkeley.edu/
San Fernando Valley Linux User Group
http://sfvlug.zimage.com/
Los Angeles Linux User Groups
http://www.lalugs.org
Sacramento Area Linux User Group
http://wwww.saclug.org/
Bay Area Linux User Group
http://www.balug.org/
Santa Cruz Linux User Group
http://linus.got.net/
Central Valley Area Linux Enthusiasts
http://www.cvale.org

COLORADO

Colorado Linux Users and Enthusiasts
http://www.clue.denver.co.us/~clue/
Boulder Linux User Group
http://lug.boulder.co.us/
North Colorado Linux User Group
http://www.nclug.org/

CONNECTICUT

Eastern Connecticut Linux User Group
http://www.downcity.net/eclug/
Fairfield Linux User Group
http://www.flug.org/

DELAWARE

Delaware Linux User Group
http://www.delug.org/

DISTRICT OF COLUMBIA

Washington DC Linux User Group
http://www.tux.org/dclug/

FLORIDA

Florida Linux Users
http://florida.linuxusers.org

GEORGIA

Atlanta Linux Enthusiasts
http://www.ale.org/

HAWAII

Linux Users AnonymoUs
http://luau.hi.net

IDAHO

South Western Idaho Linux User Group
http://www.cyberhighway.net/~rbtech
North Idaho Linux User Group
http://www.nic.edu/iccstaff/wfrishse/LINUX/UserGroup/

ILLINOIS

Windy City Linux User Group
http://www.windycitylug.com
Linux Users of Central Illinois
http://www.luci.org/
ChicagoLand Linux User Group
http://clug.chicago.il.us/

INDIANA

Indianapolis Linux User Consortium
http://www.inluc.org/
Fort Wayne Linux User Group
http://members.tripod.com/fwlug/fwlug.html

IOWA

LUGnuts
http://www.icarus.net/linux-users/
Central Iowa Linux User Group
http://linux.iowa.org/

KANSAS

Kansas Unix & Linux User Association
http://kulua.org/

KENTUCKY

University of Kentucky Linux User Group
http://www.uky.edu/StudentOrgs/UKLUG/
Western Kentucky University Linux User Group
http://linux-cs.tccw.wku.edu/
S+LUG
http://www.slug.louisville.edu/

LOUISIANA

Northeast Louisiana Linux User Group
http://nelalug.acmeexplosivebird-seed.com
New Orleans Linux User Group
Contact only: krzeszut@cs.uno.edu

MAINE

Maine Linux User Group
http://www.lily.org/melug/
Cape Cod Linux User Group
http://network54.com/Hide/Forum/46942

MARYLAND

Baltimore Area Linux User Group
http://members.home.net/madas/baltolug.html
The University of Maryland Linux User Group
http://www.umlug.umd.edu/

MASSACHUSETTS

Boston Linux and Unix User Group
http://www.blu.org/
University Of Massachusetts Linux User Group
http://lcug.ece.umassd.edu/

MICHIGAN

Metro Detroit Linux User Group
http://www.mdlug.org/
Kalamazoo Linux User Group
http://klug.armintl.com/

MINNESOTA

Twin Cities Linux User Group
http://www.mn-linux.org

MISSISSIPPI

Central Mississippi Linux User Group
http://www.cmlug.org
Linux Users Group of Jackson
http://www.lugoj.org/

MISSOURI

Kansas City Linux User Group
http://kclug.org/
St. Louis Unix User Group Linux
http://www.cs.umsl.edu/~feldt/sluugls/

MONTANA

Montana Linux User Group
http://www.mtlug.org/
Yellowstone Valley Linux User Group
http://lug.cotcomsol.com/

NEBRASKA

Omaha Area Linux User Group
http://home.earthlink.net/~astre/

NEVADA

Las Vegas Linux User Group
http://www.thcnet.net/lvlug
Reno Linux User Group
http://www.rlug.org/

NEW HAMPSHIRE

Greater New Hampshire Linux User Group
http://linux.codemeta.com/linux/
MONADLUG
http://www.monadlug.org

NEW JERSEY

New Jersey Linux User Group
http://njlug.rutgers.edu
Northern New Jersey Linux User Group
http://www.for-him/njlug/

NEW MEXICO

New Mexico Linux User Group
http://www.nmlug.org

NEW YORK

New York Linux User Group
http://www.nylug.org/
Linux User Group of New York
http://www.luny.org/

NORTH CAROLINA

Duke University Linux User Group
http://www.duke.edu/web/dulug/
Triangle Linux Users Group
http://www.trilug.org/

NORTH DAKOTA

Linux Trio
http://skyscraper.fortunecity.com/dos/662/

OHIO

Cincinnati Linux User Group
http://www.clug.org/
Cleveland Linux User Group
http://cleveland.lug.net/

OKLAHOMA

OKCLinux
www.okclinux.com

OREGON

Portland Linux User Group
http://plug.northwest.com/
Eugene Linux User Group
http://eugene-linux.cyber-dyne.com

PENNSYLVANIA

Philadelphia Area Linux User Group
http://www.nothinbut.net/~plug/
Pitt Lug
http://www.pitt.edu/~pittlug/

RHODE ISLAND

Rhode Island Linux User Group
http://www.rilug.com/
Ocean State Linux User
http://www.rilinux.org/

SOUTH CAROLINA

Charleston Linux User Group
http://clug.webplanets.com/
Columbia Area South Carolina Linux User Group
http://www.rune.org/colalug/

SOUTH DAKOTA

Siouxland Linux User Group
http://linux.midco.net/slug/

TENNESSEE

Nashville Linux User Group
http://www.nlug.org/
Chattanooga Linux User Group
www.calug.org

TEXAS

Austin Linux User Group
http://www.austinlug.org
Houston Linux User Group
http://www.astronet.net/linux/default.html

UTAH

Salt Lake Linux User Group
http://www.sllug.org/
Provo Linux User Group
http://www.plug.org/

VERMONT

Small Linux User Group of Vermont
http://www.slug-vt.org/

VIRGINIA

Linux User Group of Northern Virginia
http://www.tux.org/novalug/
Richmond Linux User Group
http://www.announce.com/hallow/rivalug/

WASHINGTON

Bellingham Linux User Group
http://www.blug.org
Linux User Group at University of Washington
http://students.washington.edu/linuxug/

WEST VIRGINIA

The West Virginia Linux User Group
http://www.wvlug.org/

WISCONSIN

Green Bay Area Linux User Group
http://www.gblug.scitele.com/
Milwaukee Linux User Group
http://mlug.waukesha.tec.wi.us

WYOMING

Laramie Wyoming Linux User Group
http://www.angelfire.com/wy/magiclair69/
Gillette Linux User Group
http://deadfrog.kung-foo.org/glug/

AUSTRALIA

Linux Users of Victoria
http://www.luv.asn.au

CANADA

Victoria Linux User Group
http://www.vlug.org
Toronto Linux User Group
http://tlug.ss.org
Nova Scotia Linux User Group
http://www.nslug.ns.ca

ENGLAND

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Liverpool Linux User Group
http://www.pjhowden.demon.co.uk/

FINLAND

Finish Linux User Group
http://www.mpoli.fi/flug/

JAPAN

Tokyo Linux User Group
http://www.tlug.gr.jp

ZAMBIA

zmlinux
http://zmlinux.fdns.org/

TERMinator

Tech Terms Revealed

Technical terms found throughout *Maximum Linux* are [illegible]. Can't find what you want here? Check out Terminator online at www.maximumlinux.com.

A

Artificial Intelligence Programs that make computers behave as if they were intelligent.

B

Bots Computer-controlled opponents. Any type of autonomous software that operates as an agent or simulates a human activity.

C

CAD Short for Computer Aided Design. A CAD system is a combination of hardware and software that enables engineers and architects in the design process.

Child servers Slang for "daughter processes" that a main server process spawns. Or, cheap manual labor used by Nike.

D

Deathmatch The type of game players run around and kill each other. It's even more fun than it sounds. Trust us.

DHCP server Dynamic Host Configuration Protocol. DHCP is a protocol for automatically assigning TCP/I information to computers (RFC1541).

Dhrystone MIPS A simple benchmark program that is supposed to measure system/integer speed.

E

end boss The final monster in most games. Usually much bigger and more powerful than previous ones. Or, the last person you'll meet with to resign when you finally strike it big on one of those Linux IPOs.

G

glibc 2.1 The GNU C Library. This is a library of functions and routines in the C programming language that is required by most software programs. Versions 2.0 and higher are referred to as glibc, while older versions are called libc.

Grand Master The final opponent in *Unreal Tournament*. Goes by the name of Xan. Beat him if you can. Survive if he lets you.

K

KDE 1.1.2 The K desktop environment—not to be confused with KFC. And no, the "K" doesn't stand for anything.

KFC Short for Kentucky Fried Chicken. There's an urban legend floating around our office that the "C" in KFC doesn't actually stand for chicken anymore, as the company allegedly has resorted to using genetically mutated, beakless entities that aren't actually chickens at all.

Kitty litter Sand-like substance used by cats to bury fecal matter. Also great for absorbing oil.

Kmail The mail client included with KDE. It is small, stable and fast.

L

LCD Short for Liquid Crystal Display. Usually used in portable computers and PDAs. LCD displays utilize two sheets of polarizing material with a liquid crystal solution between them. An electric current that is passed through the liquid causes the crystals to align so that light cannot pass through them. Each crystal acts as a shutter, either allowing light to pass through or blocking it

Linear maps Maps with a distinct beginning, middle, and end, and a single path from start to finish.

Linuxconf A graphical interface to configure a Linux system. Client tasks, server tasks, user accounts, file systems, and just about every other Linux system attribute can be tweaked with it. Linuxconf modules can also be downloaded to add new functions.

M

Maps Analogous to "levels." The area of the game where you actually run around. Also, things that guys refuse to open when they're lost.

MBNA A bank.

N

ncurses Short for new curses—the approved replacement for the 4.4BSD classic curses, library routines providing users a terminal-independent method of updating character screens with reasonable optimization.

NFS The Network File System. Initially developed by Sun Microsystems as a protocol to allow transfer of files over potentially unreliable networks.

Non-free branches Software that is licensed in a way restricting its distribution. Or, banks that charge for in-person visits.

Non-linear maps Sprawling maps where players can go anywhere at anytime.

O

OSS sound drivers Short for Open Sound System. Sound drivers for most versions of UNIX. Cards not supported include Diamond's Monster Sound M80 and MX200.

P

PIM Short for Personal Information Management. Usually associated with PDA software such as calendars, address books, and telephone lists.

Q

Quake You're kidding right? Quake is the original gangsta' of online games. The "Don Mega" of 3D shooters. The game that started it all.

S

Samba A freeware SMB server/client for UNIX. The Samba server allows a Linux machine to share files and printers on a Windows network. The Samba client allows a Linux machine to access files and printers on a Windows network.

Saving Private Ryan Steven Spielberg's award-winning movie containing a disturbingly realistic portrayal of the infamous D-Day invasion of Normandy beach.

Symbolic math Tools which propeller heads use to do the hard work of deriving complicated math equations.

T

Task switcher Programs used in the Dark Ages of single-task desktop OSes to switch between multiple open applications.

U

Unstable Software that is considered not fully tested or too new to be included in a standard distribution. Unstable also refers to the state of mind of the average user after trying to get QuakeIII to run successfully for the tenth time.

X

XFree86 3.3.5 XFree86 is a freely available version of the X Windows system designed to run on *NIX and *NIX-like operating systems.

Y

Yacas Short for Yet Another Computer Algebra System. An elegant little symbolic math program currently being developed by Ayal Pinkas.

YaST An acronym for SUSE's "Yet Another Setup Tool".

Yo-Yo A child's toy. Or a term used to describe an editor's state of mind at *Maximum Linux* magazine.

biOS to the Source

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Carl lives in beautiful Victoria, British Columbia and works as a technical writer for Metrowerks, makers of the CodeWarrior development environment. When not spending time with his wife Terry and three kids, Carl can be found dispensing advice at the Victoria Linux User Group. You can write to him at: carl@maximumlinux.com.

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Aldo Cimino

Aldo Cimino is a self-taught Linux enthusiast and Psychology student. He is in the process of obtaining LPI certification and admission to UC Berkeley. In his spare time, Aldo devours science books and dreams of a Nobel prize. He also enjoys taking motorcycle rides with his girlfriend. Write him at aldo@maximumlinux.com.

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Jason Perlow

Always on the bleeding edge of technology, Jason's on an endless quest to acquire the latest and greatest hardware and software toys. He claims he's just an insatiable uber-geek, but we think he needs a lot of professional help. And fast. He can be reached at jason@maximumlinux.com.

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Daevid Vincent is the former webmaster for boot and MaximumPC. He currently resides in the Redmond, WA area and plots to overthrow the Empire through the evangelism of Linux. In his spare time, he is entertained by biometrics, audio samplers, first-person shooters, and Goth Girls. You can reach him at daywalker@thematrix.com.

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David Reynolds, Mac Addict's Executive Editor, runs a Linux box as a firewall for his home network, which also doubles as a Web server. He finds playing around in Telnet sessions oddly interesting and can't wait until Mac OS X (with its BSD underpinnings) is released later this year. E-mail him at dreynolds@macaddict.com.

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Scott Locklin is a physicist, sysop, and disgruntled government worker who occasionally whores on the side as a UNIX consultant. When he's not torturing atoms in his laboratory or breaking into his boss's computer, he enjoys eating red meat, brewing beer, practicing martial arts, making eyes at Goth girls, and target shooting, preferably all at once.

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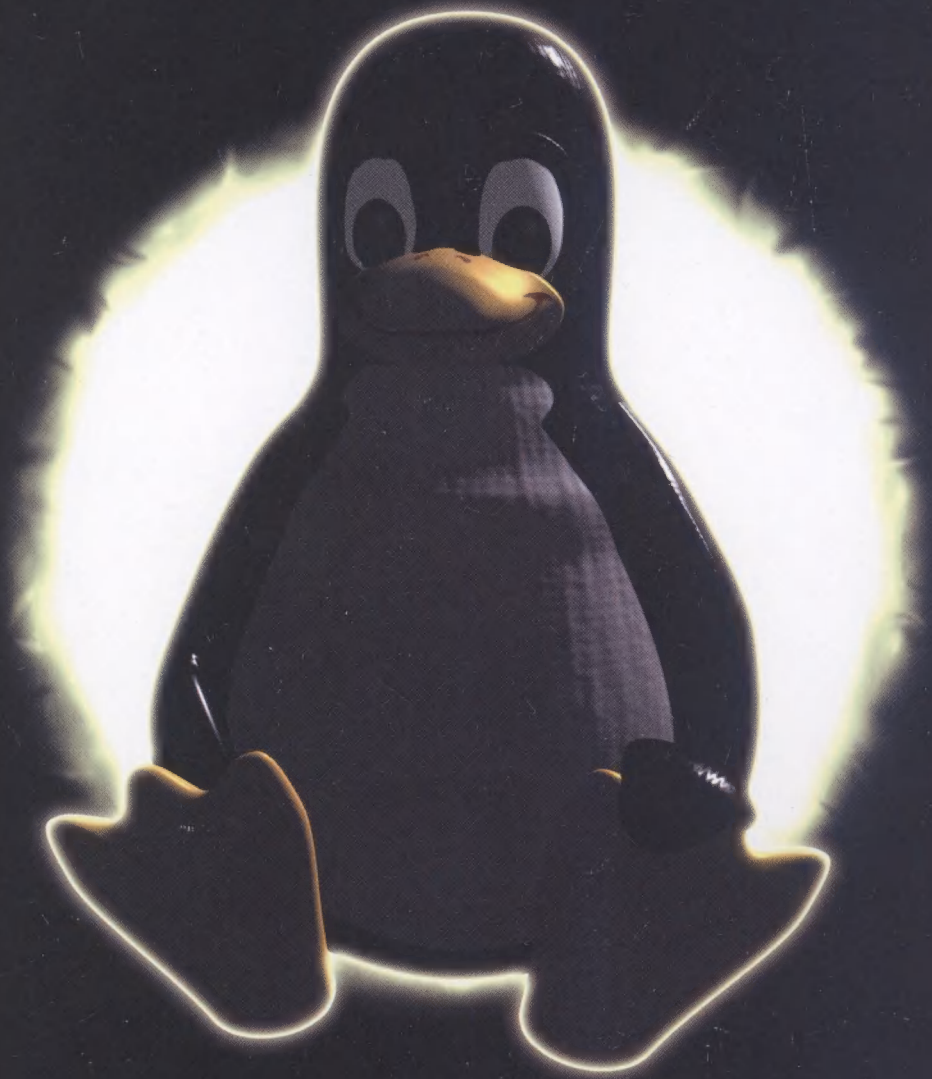

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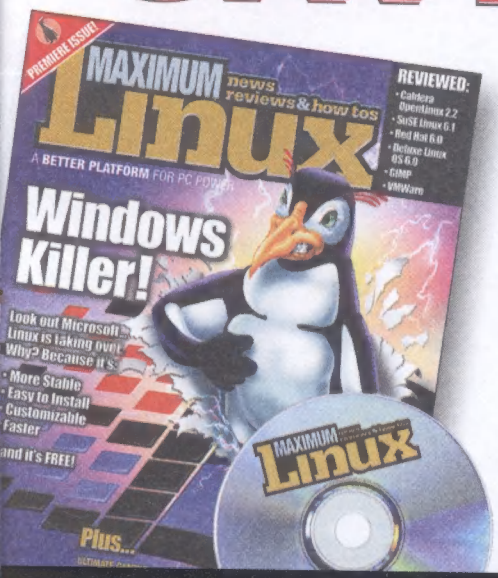

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